

The Only Journal With a Paid Circulation in the Rock Products Industry

# Rock Products

Entered as second-class matter, July 2, 1907, at the Chicago, Illinois, Postoffice, under the Act of March 3, 1879

CLINTON S. DARLING, Editor  
CHARLES A. BRESKIN, Adv. Mgr.  
E. M. GIBSON, Asst. Mgr.  
N. C. ROCKWOOD, Advisory Editor  
H. E. HOPKINS, Associate Editor  
C. H. FULLER, Mgr. New York Office  
GEO. P. MILLER, Manager

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W. D. CALLENDER, President  
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C. O. NELSON, Secretary

Volume 25

May 6, 1922

Number 9

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Serving these readers honestly and faithfully has been the aim in the past, and that aim is emphasized for the future. That is why producers say, "We think a great deal of your magazine" and why they will keep on saying, "We couldn't get along without it."

\*

## Worth Watching For

TREMENDOUSLY interesting is the story of the greensand marls of New Jersey. Of value to all producers of non-metallic minerals is the description of various methods of producing this mineral at a profit. The combined story and plant descriptions of this New Jersey industry have been prepared in a series of three attractive articles which will commence in an early issue of ROCK PRODUCTS.

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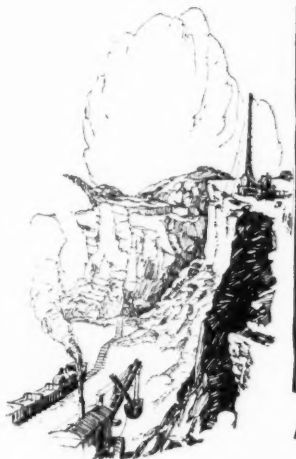
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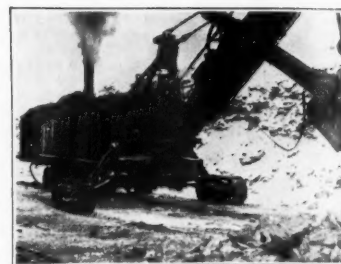
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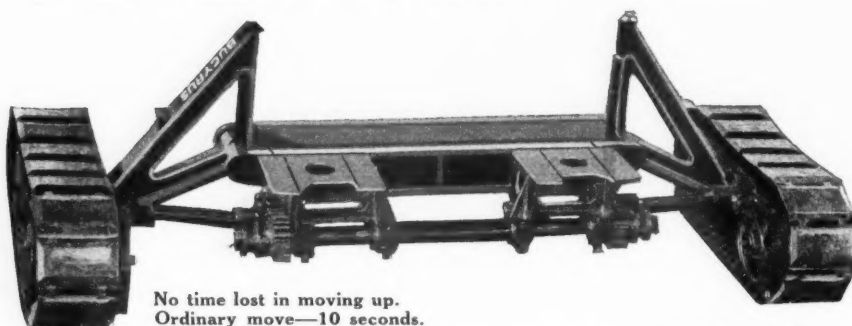
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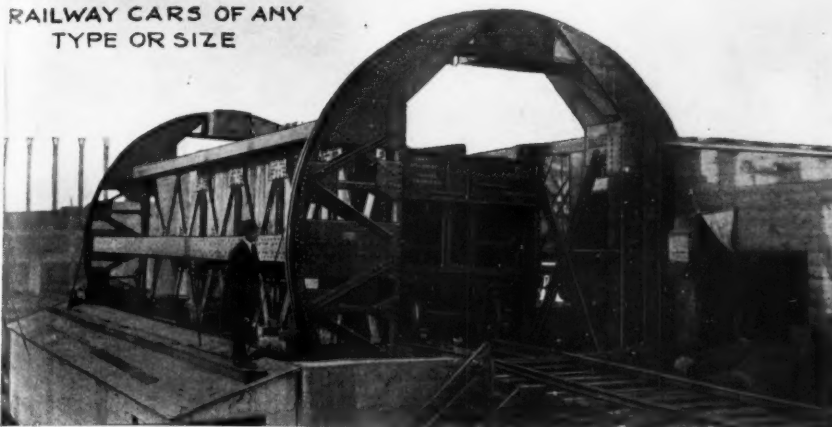
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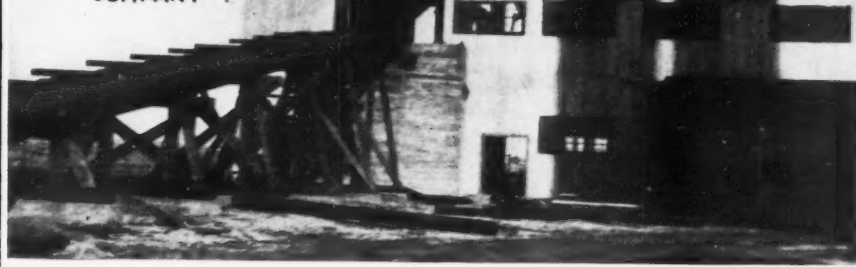
Send for a copy of the special supplement to our Standard Shovel Bulletin A-1. It explains Bucyrus caterpillar mounting for standard shovels.

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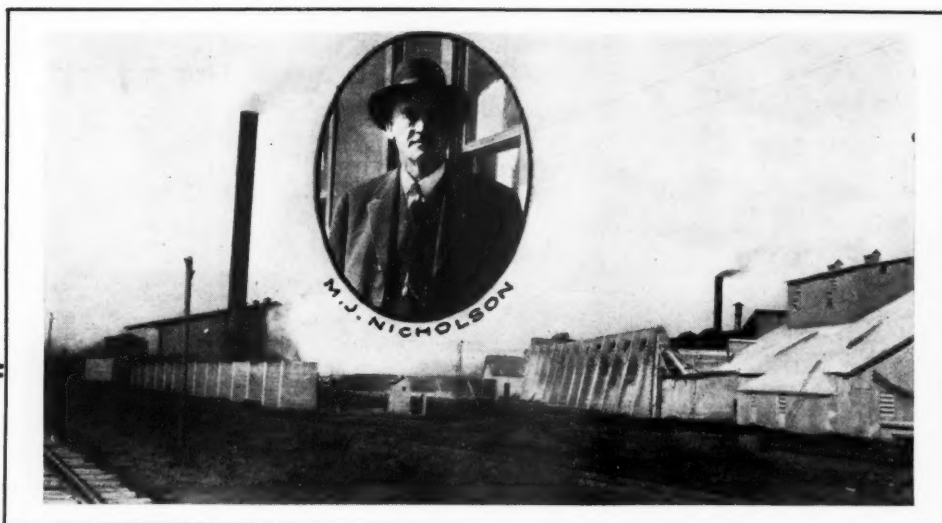
Equal results are secured with smaller solid-body cars in any quarry.

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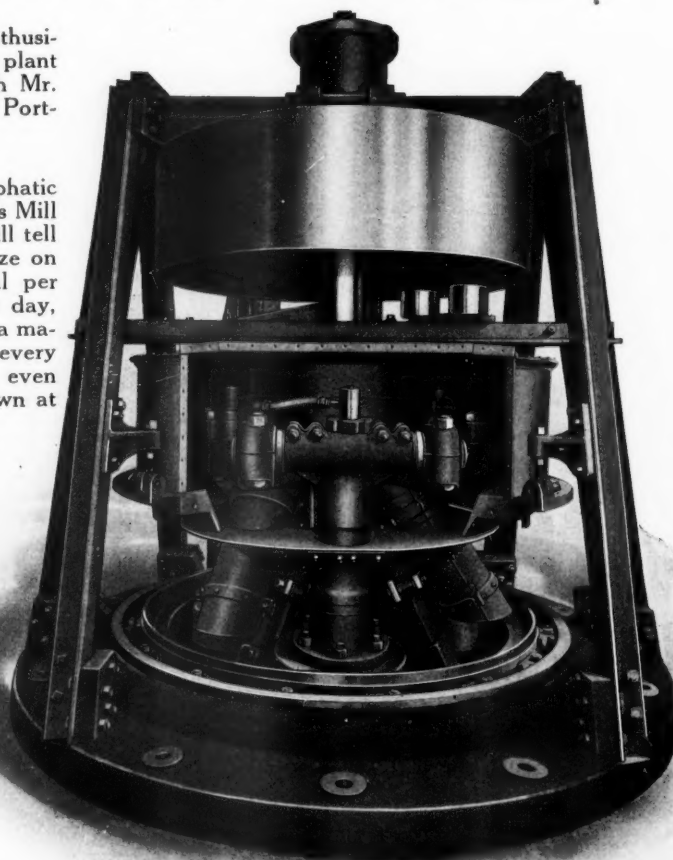
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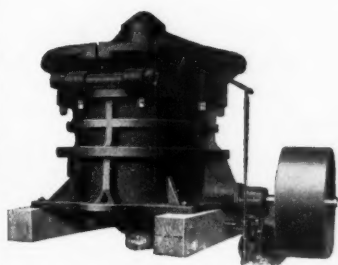
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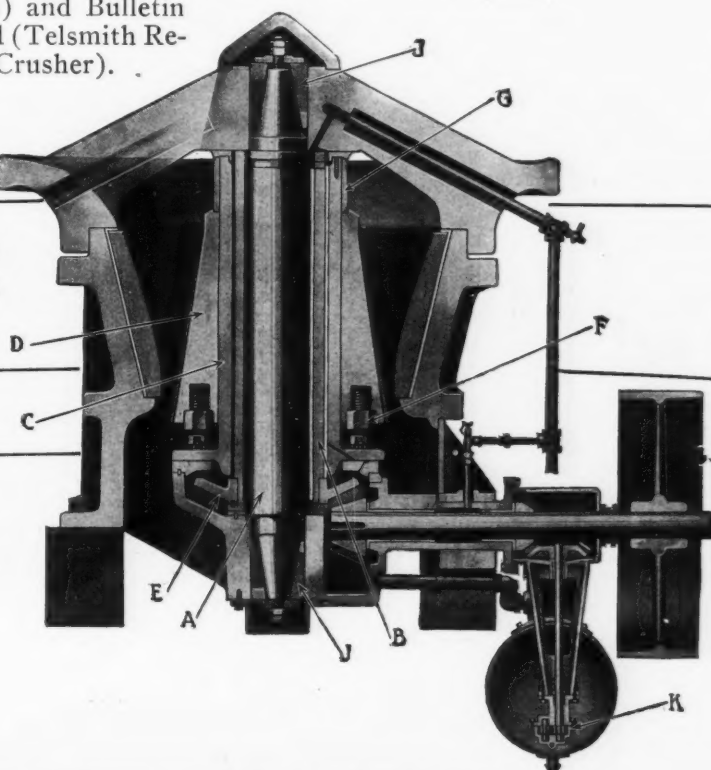


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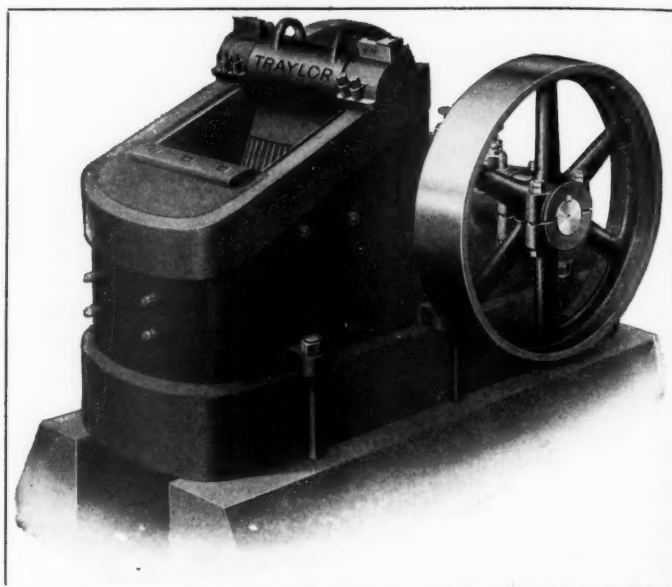
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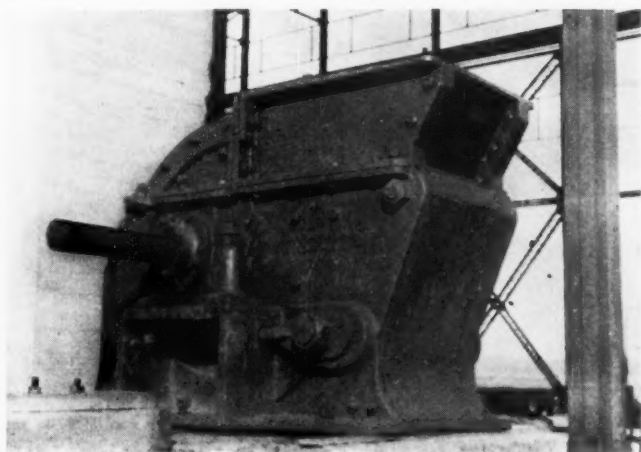
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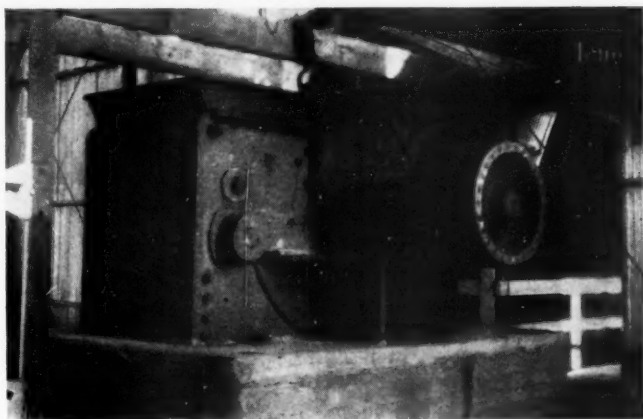
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This was the case when the engineers in charge of the new plant now being erected by the Pyramid Portland Cement Co., near Des Moines, Iowa.

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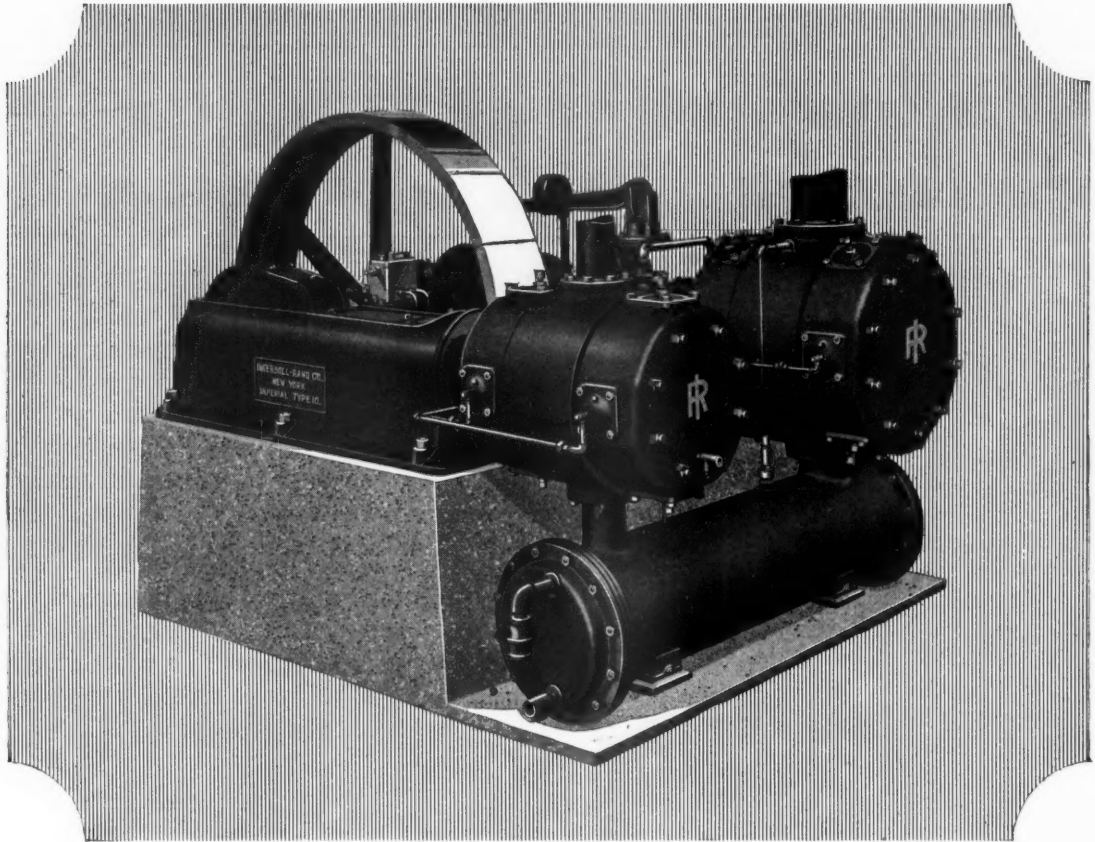
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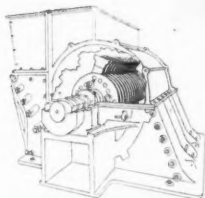
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"It has been a source of pleasure to operate this crusher from every standpoint in the producing of our product."—The Monarch Cement Company, Humboldt, Kans.

"I have been operating your No. 2 Combined Crusher and Pulverizer for the past 60 days with 5 men, and am handling from 12 to 15 tons an hour feeding in limestone weighing 60 lbs. to 100 lbs. and pulverizing it to fertilizer size in one operation.

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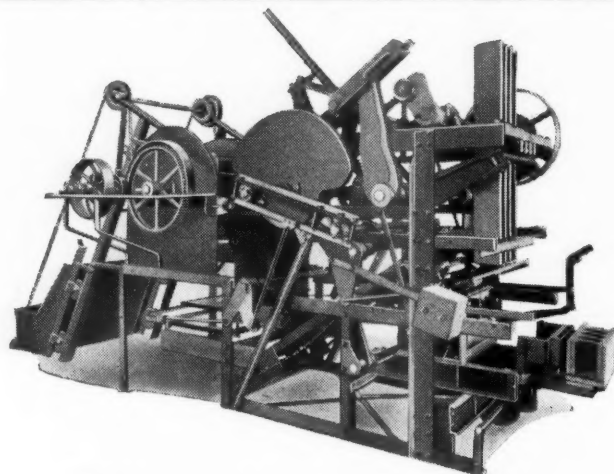
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**PATENT CRUSHERS GRINDERS SHREDDERS**

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## The Automatic Combination Block and Tile Machine That Gives You TWO Profits On Your Sand and Gravel

Any manufactured article is worth several times more than the raw, unfinished material. That's a truth as old as the hills.

And the Manufacturer who converts *all* of his raw material—even much of his by-product and waste—into finished manufactured articles, takes the doubt out of his business and puts profit into it.

The by-products of *your* business, while saleable as raw material, can be largely *increased* in value when turned into high grade concrete block, brick and tile.

BESSER Automatic Concrete Products Machinery gives you two profits from your pile of sand, gravel and other rejects. The Market for block, brick and tile is already large and constantly increasing and when you own a BESSER Machine, you've got a practical monopoly.

Write today for full information. Also tell us what your problems are, and let our engineers give you figures

### **BESSER SALES COMPANY**

*Complete Equipment for Concrete Products Plants*

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*Better Own a*  *Than Compete With One*

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# SHOPE BULLETIN

VOL. I

May 6, 1922

Number 18

## *Profit—*

The all-round superiority of Shope Concrete Brick over the clay product, or any other concrete product is always conceded where the Shope is known. 85% of the brick used in Portland, Oregon, is Shope Concrete Brick.

The Shope is always the same in size. This can be relied upon. Ten, fifteen, twenty thousand or more can be made with the positive assurance that every one will be of the same size, same texture, and with an exactness in color or shade that is impossible with the clay product.

Profit is positive. Orders can be filled in a few days without waste of material or time. You get absolutely 100% efficiency on the day's output, and don't forget, Shope Brick sell on a quality basis, besides you are protected by exclusive territory rights, by basic patents on machinery and process of manufacture.

Get the maximum returns on the sand, crushed stone screenings or crushed slag screenings that probably go to the waste pile. Investigate our proposition.

Remember, you have no competition in your territory when you manufacture this product

## Shope Brick Company

361 East Morrison Street

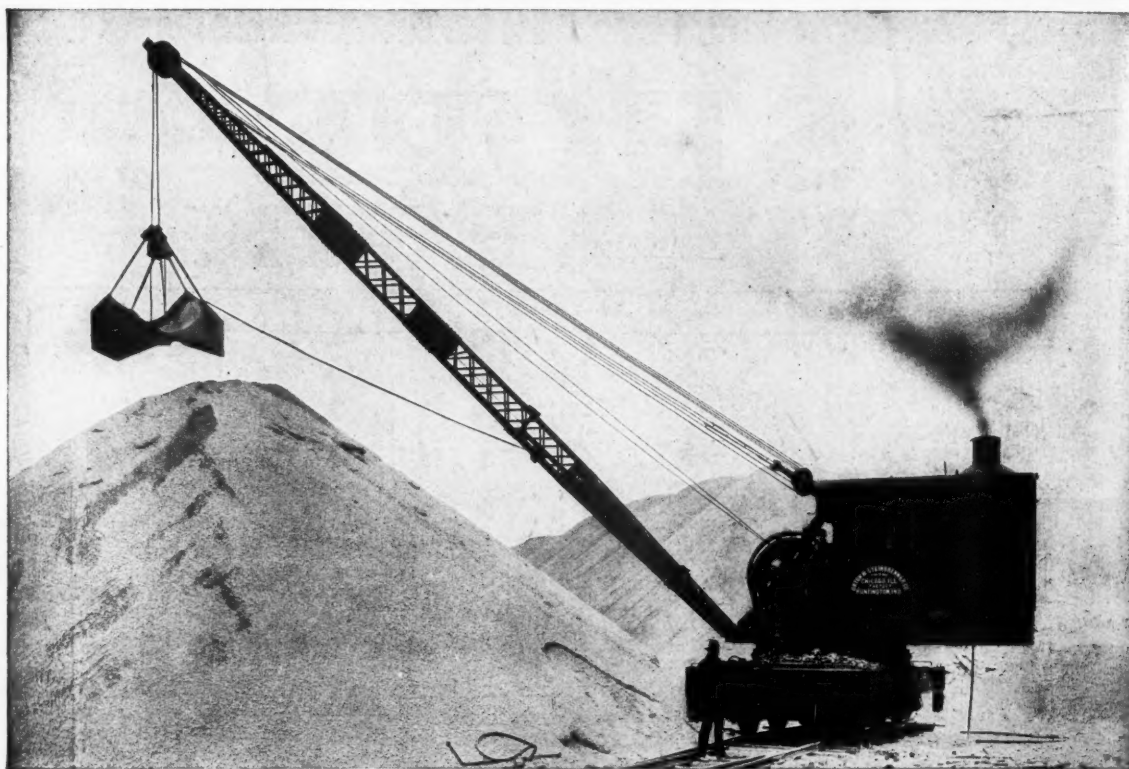
Portland, Oregon

### LICENSEES:

The Miles Co. .... Salem, Ore.  
Eugene Concrete Co. .... Eugene, Ore.  
Wastenburg Brick Co. .... Klamath Falls, Ore.  
Arizona Shope Concrete Brick Co. .... Phoenix, Ariz.  
Florida Nu-Tex Brick Co. .... 109 Water St., Tampa, Fla.  
Texas Shope Brick Co. .... 3056 Sumpter Bldg., Dallas, Tex.  
Birmingham Slag Co. .... Birmingham, Ala.  
Shope Brick Co. of Wisconsin. .... 50th and State Sts., Milwaukee, Wis.  
The Polychrome Cement Brick & Tile Co. .... Carter-Cotton Bldg., Vancouver, B. C.

Dark Canyon Stone Co., H. W. Jones, Mgr., Rapid City, S. D.  
Warren Sand & Gravel Co. .... Easton, Pa.  
Penn Shope Brick Co. .... Reading, Pa.  
Lycoming Shope Brick Co. .... Williamsport, Pa.  
Shope Brick Co. .... Portland, Ore.  
Rustic Brick & Supply Co., Palette Rd., Ford City, Ont., Can.  
Puyallup Shope Brick Co. .... Puyallup, Wash.  
The Shope Brick Co. .... Springfield, Mass.  
Utah Shope Brick Co., P. O. Box 632, Salt Lake City, Utah  
Decoration Brick Co. .... 1565 N. Lake Ave., Seattle, Wash.

These licensees are all successful manufacturers



30-TON CRANE  
With 60-ft. boom and 2-yd. bucket

## O. S. DEPENDABLE

**L**OOK at the problem squarely—Some day you will use O-S Dependable Cranes and Grab Buckets and forever after you will be a defender of their merits.

The material handling machinery made by Orton and Steinbrenner Co. is not "just suitable." It is unsurpassed for simplicity and accessibility. The quality of the material and workmanship insures a rare economy of performance.

Our booklet on this subject is profusely illustrated with photos of our cranes on the job and contains a world of information concerning details that are far beyond the space limitations of this advertisement.

It will be sent to you on request

### Orton & Steinbrenner Company

CHICAGO

Factory—Huntington, Ind.

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## NON-METALLIC MINERALS

The Non-Metallic Mineral Industry has tremendous possibilities by virtue of the fundamental need, by the basic industries of the nation, for the products and by-products of many non-metallic minerals.

The success that attends the development of your deposit may be determined by one or more factors.

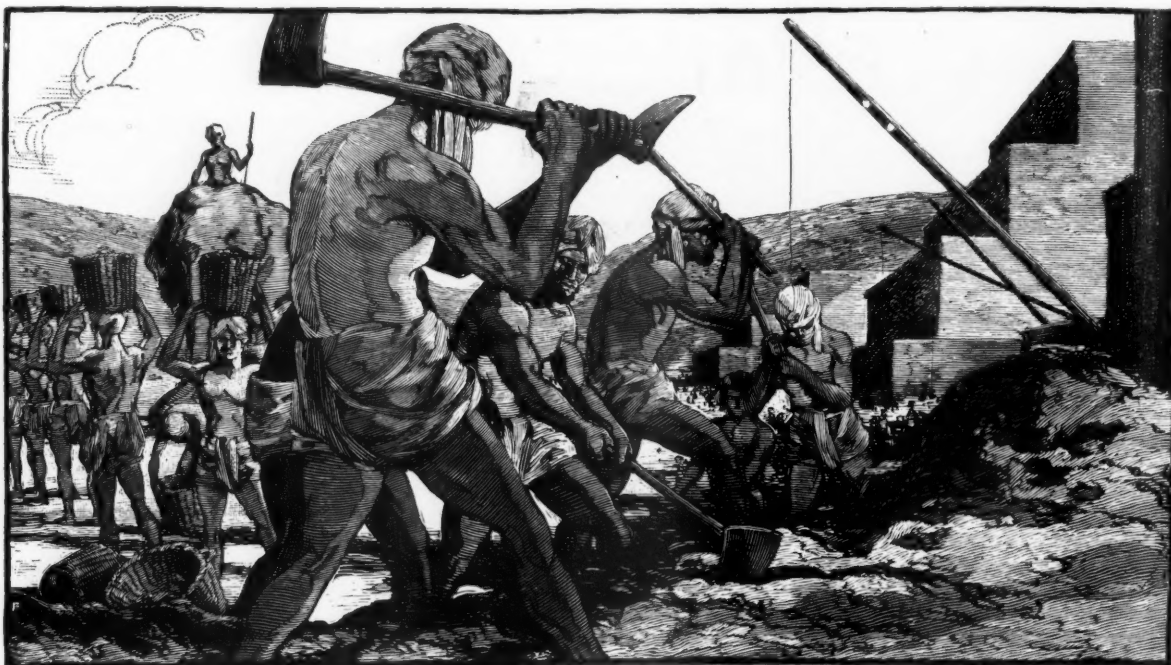
Commercially sound reports, careful analysis of your raw material, proper plant design, with machinery and equipment specifications, with other points taken into consideration, including by-products, markets, efficient plant operation and possibilities of future expansion, call for a service embodying wide practical experience, skill, and the ability to properly APPLY science.

Our organization concentrates its service in the non-metallic mineral industry. Our years of experience, and our intimate touch with every branch of the industry, provides the basis of our service to you, and makes for the successful development and marketing of your product.

**WALLER CROW, INC.**  
*Engineers*

COUNSELLORS IN INDUSTRIAL  
OPERATION & FINANCE

327 S. LA SALLE STREET • CHICAGO



## The Great Rajasamand Dam

The ruler of Rajputana, in the heart of India, began the great dam "Rajasamand" in 1661. This vast pile of white polished marble, hidden so well in the Aravalli Mountains, has remained almost unknown for generations. It is a colossal monument to these early engineers.

Twenty years were consumed in building the dam; hammers and chisels were used for cutting the rocks; large sharp hoes for excavating earth. Workmen, commanded by the Rajah, moved "in that leisurely but regular procession peculiar to the East, where time is not and obedience is law".

It is doubtful whether modern engineers can build a better structure; but today they must also consider costs. Explosives have made possible the building of dams larger than Rajasamand and equally as enduring, with much less labor and in less than one-

tenth the time; but even explosives—one of man's greatest cost-reducing inventions—must now be carefully compared and chosen.

For reducing blasting costs, we have for several years recommended Hercules Special No. 1 on work for which it is suited. This dynamite contains nothing but the highest grade of standard materials and by wide use has proved its dependability. Special No. 1 replaces 35% and 40% cartridge for cartridge, but, because of its higher cartridge-count, costs less per cartridge than 15% dynamite. No high explosive on the market is more economical than Hercules Special No. 1.

If you are interested in the elimination of waste, write to our advertising department, 951 King Street, Wilmington, Delaware, for our booklet, Volume vs. Weight—A Lesson in Explosives Economy.

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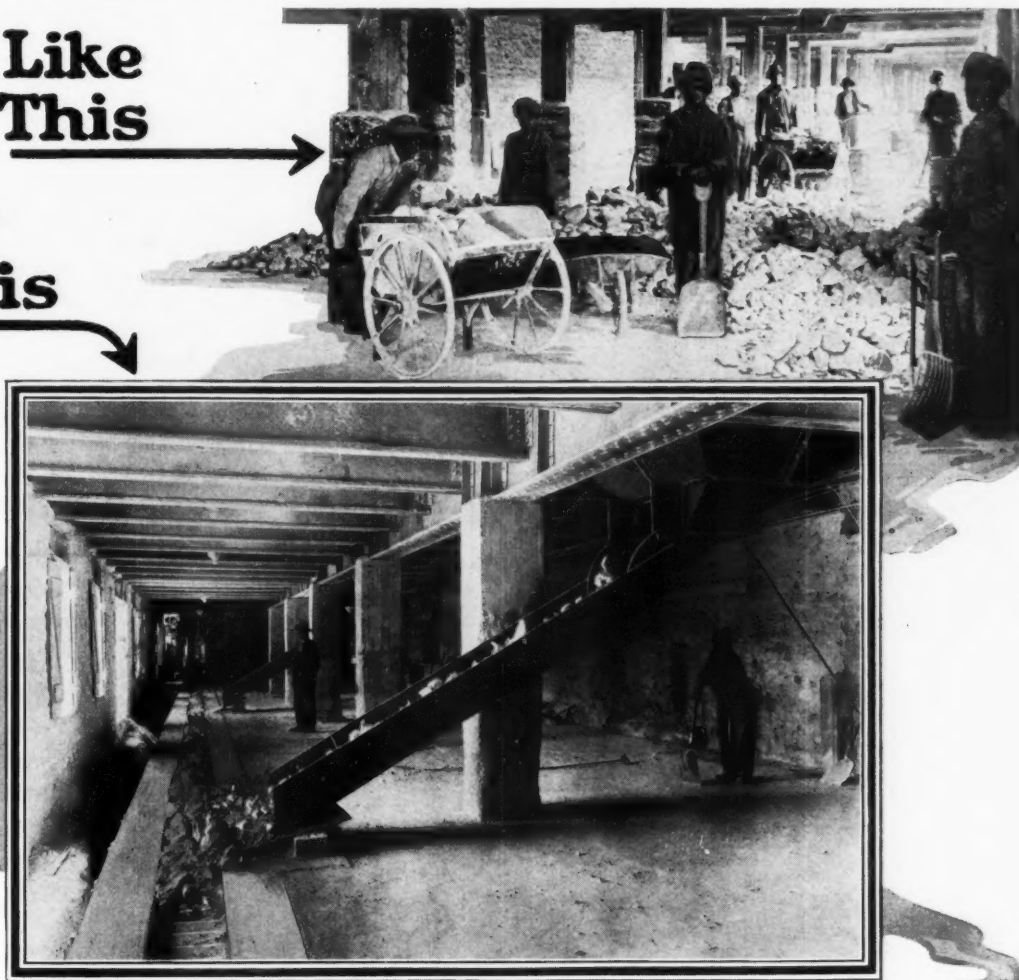
Salt Lake City, Utah  
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When writing advertisers please mention ROCK PRODUCTS

# How Do You Handle Lime?

Like  
This

Or  
This



**A**BOVE—the old-fashioned system of drawing the kilns by hand, piling the lime on the floor, and carting to crushers or cars in wheelbarrows.

Below—the modern and up-to-date Link-Belt method (part of our equipment furnished the Riverton Lime Co., Riverton, Va.), where the lime is handled by machinery from the kilns to overhead storage bins, and thence to shaker screen, which delivers to crusher, box car loader, or barrels, all with a minimum of labor, expense and increased output.

Lime is not difficult to handle by machinery. The intermittent service of the conveyors and the slow speed at which they run make for long life and low maintenance cost.

We have brought many old-fashioned plants up to date at a minimum of cost, and would welcome the opportunity of talking this matter over with you.

Send for our new 80-page book No. 416. It contains facts and figures on the mechanical handling of stone and lime.

LINK-BELT COMPANY, Chicago, 300 W. Pershing Rd.; Philadelphia, Hunting Park Ave. and P. & R. Ry.

# LINK-BELT

*When writing advertisers please mention ROCK PRODUCTS*

# Just Hook It Onto the Crane Block

## BLAW-KNOX Single Line Buckets

Your single drum crane or derrick can be clamshell equipped by the installation of a Blaw-Knox Single Line —simply throw the yoke of the closing line over your crane hook and *go to work*. No change in the hoisting machinery is required.

Sand, stone, coal, ores, etc.—the SINGLE LINE is a sturdy, substantial, effective clamshell for all kinds of loose bulk material handling.

Made in a number of types and sizes suitable for all kinds of hoisting equipment and rehandling requirements.

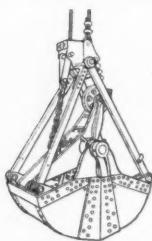
*Have a SINGLE LINE Bucket handy—  
ready to pounce onto any rehandling job*

### BLAW-KNOX COMPANY

619 Farmer's Bank Bldg.  
Pittsburgh, Pa.

New York Boston Baltimore Birmingham  
Chicago Detroit San Francisco  
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### The Blaw-Knox DREADNAUGHT



The Blaw-Knox Dreadnaught is an exceptionally hard digging bucket—combining tremendous power with rugged and lasting construction. A perfect bucket for the contractor who foresees his rehandling and digging needs for years to come.

All sizes—for any type of hoisting equipment.



*When writing advertisers please mention ROCK PRODUCTS*

# Specialization is Necessary to Design Quarry Cars



Enormous strength combined with flexibility are necessary elements of Quarry Car Construction. The rigid car can not be built that, without flexibility, will withstand all classes of quarry service and safely carry all classes of quarry loads.

The body of the one-way dump car shown above rides on heavy spring supports. It is a real pleasure to the experienced quarryman to see this car travel uneven track under load and to watch the shock absorption of the compensating spring supports. The car is supported at eight points. Bed floor is covered with heavy steel floor plates, reinforced with T-Rails fitted between floor planking. Wheels and axles are standard M.C.B. with journal boxes in spring pedestals. Cast steel pedestal columns—Capacity 10 cu. yds. The same car has been built in capacities of 5, 6, 8 and 12 cu. yds.—also in all steel construction.

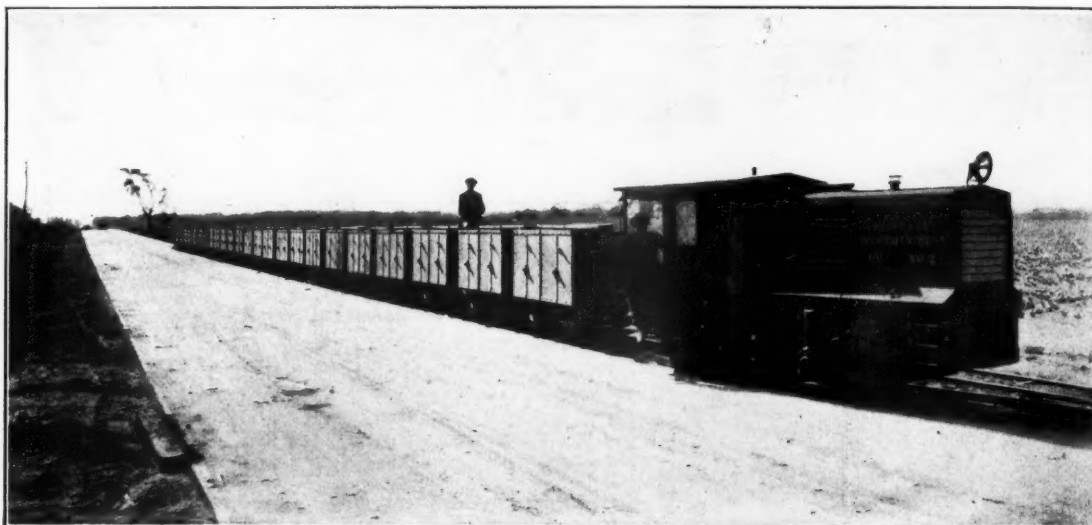
We specialize in designing and building cars to meet special and arduous conditions.

Let us show you other designs as suggestions.

*Write for Catalog No. 515*

**The Kilbourne & Jacobs Mfg. Co., Columbus, O., U.S.A.**

**New York—120 Broadway**



## The Predominating Plymouth Locomotive

Predominates in every industry that has summoned gasoline locomotives to its aid.

Predominates in its ability to deliver power and endurance.

Predominates in the economy of upkeep.

Predominates in the confidence of those who have bought and used.

Predominates in the integrity of its handicraft, and the solicitude which the manufacturers extend to Plymouth owners.

Predominates in Sales, Service and Satisfaction.

Ask for literature.

**The Fate-Root-Heath Co.**  
Plymouth, Ohio



MR. R. L. BONHAM, President of The Tri-State Construction Company, Bridgeton, N. J.

### MR. BONHAM'S LETTER

Gentlemen:

We are pleased to advise that we have found the PLYMOUTH Locomotives satisfactory in every particular, and do not feel that we could have made a better selection. We completed our job in 75 working days, laying 100,000 sq. yds. of reinforced pavement, 20 feet wide and 8 inches thick.

We cannot speak too highly for the part taken by the PLYMOUTH Locomotives, and for dependability, and power, they have exceeded our greatest expectations. Our regular trains consisted of 12 cars, each carrying 2 boxes containing a 5-bag batch, 1-2-4 mix, and operating against a 3.6 per cent grade.

I am unable to figure how this was possible, as the weight of train was around 50 tons, requiring a draw bar pull of approximately 4000 lbs., which is materially in excess of your claim of 2400 lbs. All I can say is, THEY DID IT.

I feel that this was made possible by the fact that our cars were equipped with Hyatt Roller Bearings, and believe that this extra cost was an exceptionally good investment. Sincerely yours, R. L. Bonham, President

# Rock Products

Volume XXV

Chicago, May 6, 1922

Number 9

## Cement Making in Iowa

New conditions present new problems; different men have new solutions of old problems. That is one of the reasons why this article describing three plants which make portland cement in Iowa is of interest to every cement maker. Perhaps the other man has a clever way of doing something which he can adopt in his own plant

RAPID strides have been made in the portland cement industry in Iowa. The first plant was erected in 1908 at Mason City by the Northwestern States Portland Cement Co., and since then several other plants have started operation in different parts of the state. In the last issue of *Rock Products* this first plant and the plant of the Hawkeye Portland Cement Co. were described; this article tells about the plants of the Gilmore City Portland Cement Co., the Pyramid Portland Cement Co., and the Western States Portland Cement Co.

The Gilmore Portland Cement Corp., at Gilmore City, originally known as the Ft. Dodge Portland Cement Corp., has a daily capacity of 1500 bbl. of cement. This plant is undergoing changes and improvements, and with the additions will have a capacity of 3800 bbl. a day.

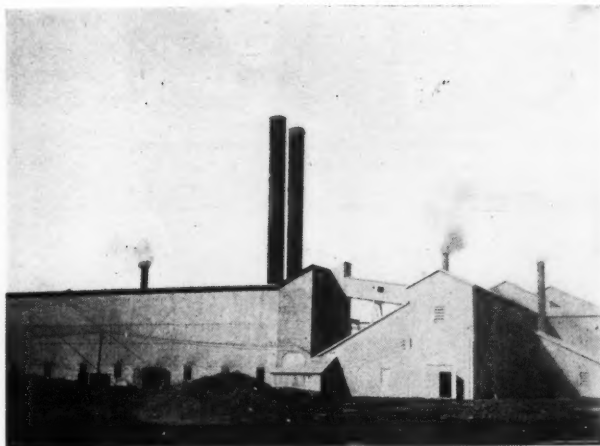
The company owns 126 acres of land on its plant site and this is all underlaid with a white, hard, high calcium limestone. The clay is obtained at a pit four miles north of Ft. Dodge and about 25 miles from the plant.

The quarry face is about 26 ft. high and extends in a long canal-shaped cut straight from the foot of the incline leading up to the crusher. For blast holing, well drills are used. The holes are drilled 16 ft. back from the face and 16 ft. apart and are loaded with 40 per cent gelatine dynamite. Detonation is by means of electric blasting caps. The rock is excavated and loaded into 4-cu. yd., 36-in. gage Western end-dump cars by a 70-C steam shovel with a 2½-yd. dipper. Two 15-ton Vulcan locomotives haul the loaded cars from the quarry face to the foot of the incline.

An electric hoist hauls the cars up to the top of the incline, where the cars are automatically end dumped into a No. 9 gyratory crusher. From here the stone is discharged direct to two No. 5 gyratories, where the secondary crushing takes place. It is reclaimed from the No. 5's by a bucket elevator which discharges to two commercial stone screens, set in tandem. The larger sizes drop into the commercial rock storage bins, while the finer sizes pass on to the cement rock storage. In the expansion, the commercial rock bins will be removed and the rock from the two No. 5 crushers will be taken by belt conveyor to a rock storage having a capacity of 20,000 tons. It will be drawn out of the storage by a tunnel belt conveyor and fed to a battery of stone driers. At present the rock is taken by means of a screw conveyor to



To the eight older silos for finished cement, shown at the left, the 24 new ones at the right have been added at the plant of the Gilmore Portland Cement Corp., giving a storage capacity of 170,000 bbl. of finished cement



*Where the grinding and drying processes are accomplished at the Gilmore Portland Cement Corporation's plant*

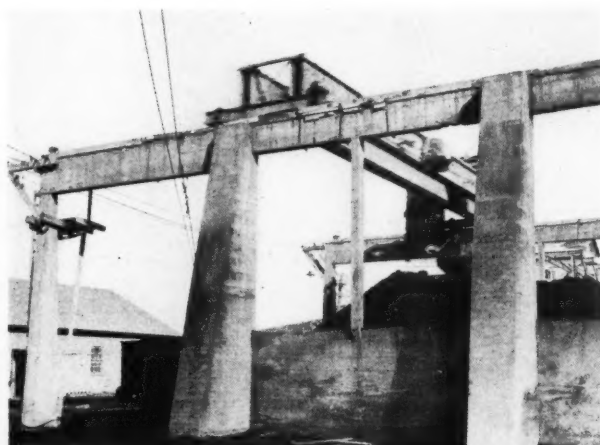


*This new clay storage will be separate from the plant and will hold 14,000 tons of dried clay*

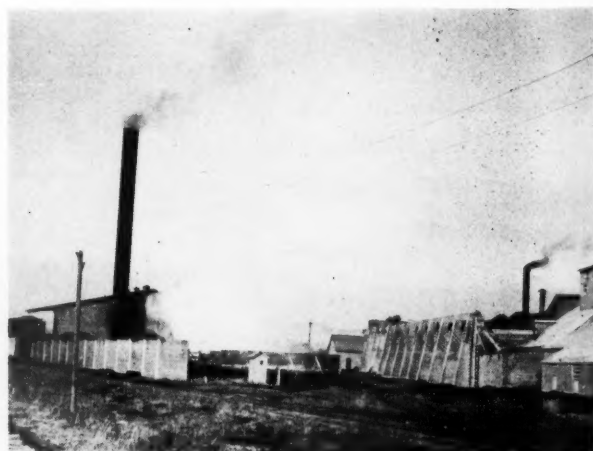


*This monorail hoist for the stone crushing plant and clay and coal receiving department has a 1½-cu. yd. clamshell bucket*

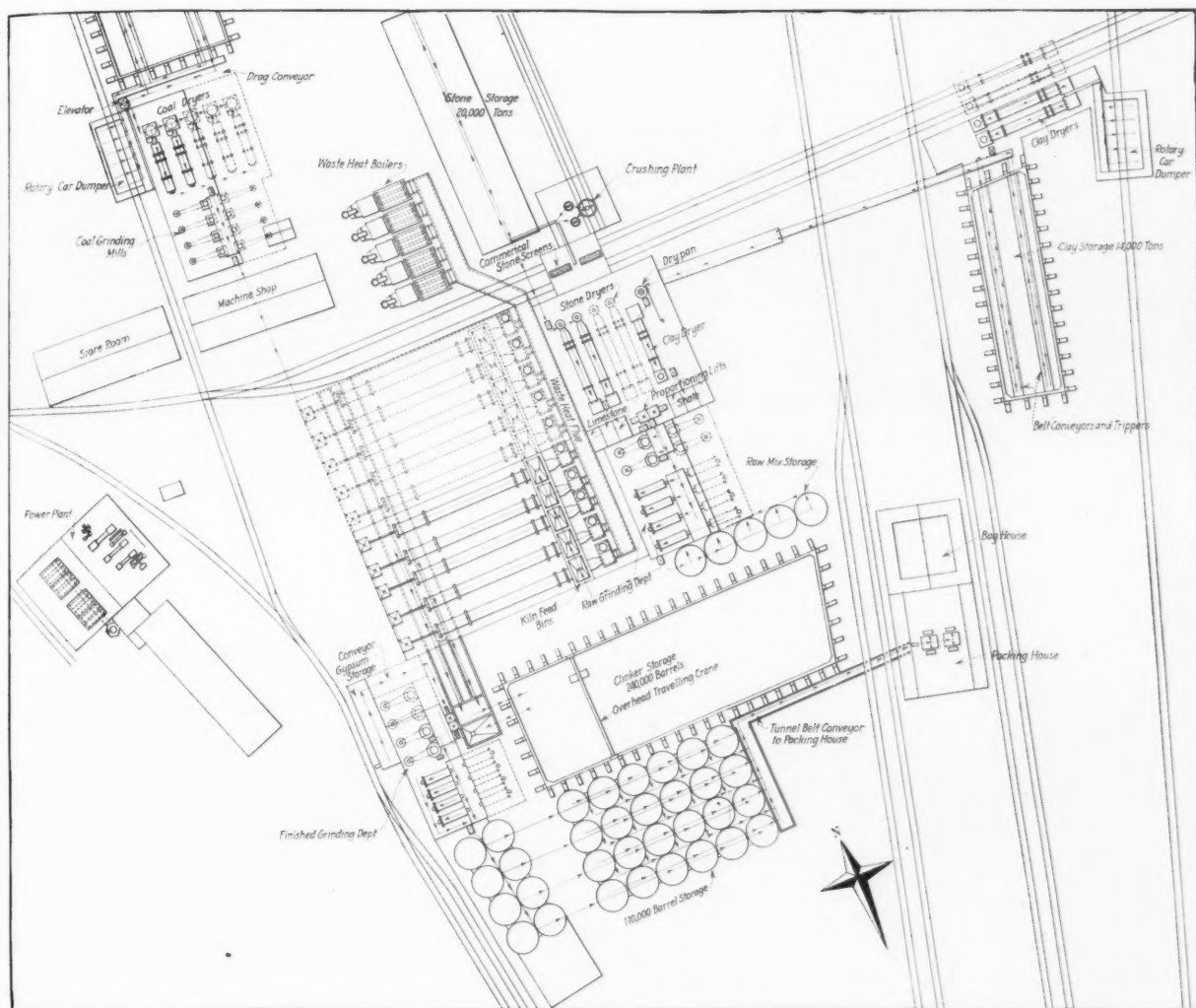
Changes and improvements at the Gilmore Portland Cement Corp. will increase its daily capacity from 1500 to 3800 bbl. a day. These five illustrations, made a short time ago, show details of the plant which are described more fully in the accompanying article.



*There's double use for this overhead electric traveling crane—it distributes clinker in storage and unloads coal*



*A glimpse of the power house on the left and the clinker storage and finish grinding department on the right*



#### HOW THE REMODELED PLANT WILL BE LAID OUT

*The new silos for storage, the five kilns with provision for five more, the increased rock, clay, and clinker storage, and the provision everywhere for expansion are indicated in this plan of the remodeled Gilmore plant*

a 5x60-ft. drier, then conveyed to the storage bins at the proportioning or raw mix department.

The gondola clay cars are taken direct to the plant clay department. Here the cars are unloaded by a Brownhoist mono-rail crane with a 1½-yd. clamshell bucket which deposits the clay to the clay storage bins. From here it is drawn out and fed to a dry pan, where it is ground. A bucket elevator reclaims the finely divided clay and deposits it in a bin over a 5 x 40-ft. drier. After passage through the drier the clay is deposited in bins at the proportioning department.

In the enlarged plant, clay will be brought to a department separate from the rest of the plant. The cars will be run on a rotary car dumper and the contents deposited in a wet clay storage. It will be drawn out by conveyors and fed to two driers, which discharge to a

bucket elevator, and this will by-pass the dried clay to either or both of two overhead belt conveyors fitted with automatic trippers, discharging to the clay storage holding 14,000 tons. It will be reclaimed by tunnel conveyors, fed to the dry pans, and brought back to the proportioning or raw mix department.

The stone and finely divided clay are now in adjoining bins. From each of the bins a proportionate amount of material is drawn off to steel hoppers mounted on scales. The mass is then discharged to a Bradley mill for preliminary grinding, then goes to tube mills for finish raw grinding. In the expansion two Bradley mills will be used, with provisions for two more and a battery of four tube mills, with space for an extra battery. From the tube mills the material is conveyed to bins over kilns or to a battery of five silos which comprise the raw mix storage.

At the present time two kilns, 8x125 ft.,

are used, but in the expansion three more kilns will be installed with provisions and space enough to include another battery of five, making a 10-kiln plant. The hot clinker is discharged to pan conveyors, and by a bucket elevator the clinker is discharged to the clinker storage which holds 240,000 bbl. At the present time the clinker is discharged into pits from the kilns. An overhead traveling electric crane with a 2-cu. yd. grab bucket distributes the clinker within the storage and also feeds it to a 14x24-in. jaw crusher which does the preliminary grinding. In the new installation a traveling crane of 85-ft. span will distribute the clinker within the storage and place it in hoppers feeding preliminary grinders. From here it will be taken to the proportioning department, where gypsum is added, and then the mass will be fed to two mills. The mills discharge to conveyors and by means of elevators and screws the clinker



#### GETTING THE RAW MATERIALS

*The rock is very white, as this steam shovel operation in the Gilmore quarry shows, and it is of high calcium content. The excavated rock is hauled to the dumping incline in end-dump cars*

will be fed to a battery of four tube mills for final pulverization. Provisions are included for two extra mills and four extra tube mills.

The finished cement is conveyed from the tube mills to the present stock house of eight reinforced concrete silos, 20 ft. in diameter and 58 ft. high. Twenty-four more silos of the same size have already been constructed so that the completed stockhouse will hold 170,000 bbl. of finished cement. The cement is drawn out of the bins over the valve bag equipment. The old stock has two machines now. The cement from the new silos will be drawn out in tunnel conveyors also and fed to the additional valve-bag equipment which will be installed in a new packing room. Adjoining the new packing house is a bag storage. Tracks will be extended to both of these buildings.

At present the coal storage adjoins the clinker storage and the crane used to distribute clinker is also used for coal handling. The crane deposits the coal in a hopper feeding a small Williams mill. From here it is conveyed to a rotary

drier and then to a Fuller mill and a Griffin mill, where the coal is converted to an impalpable powder. It is then conveyed to a pulverized coal bin, from which it is drawn out and injected into the kilns.

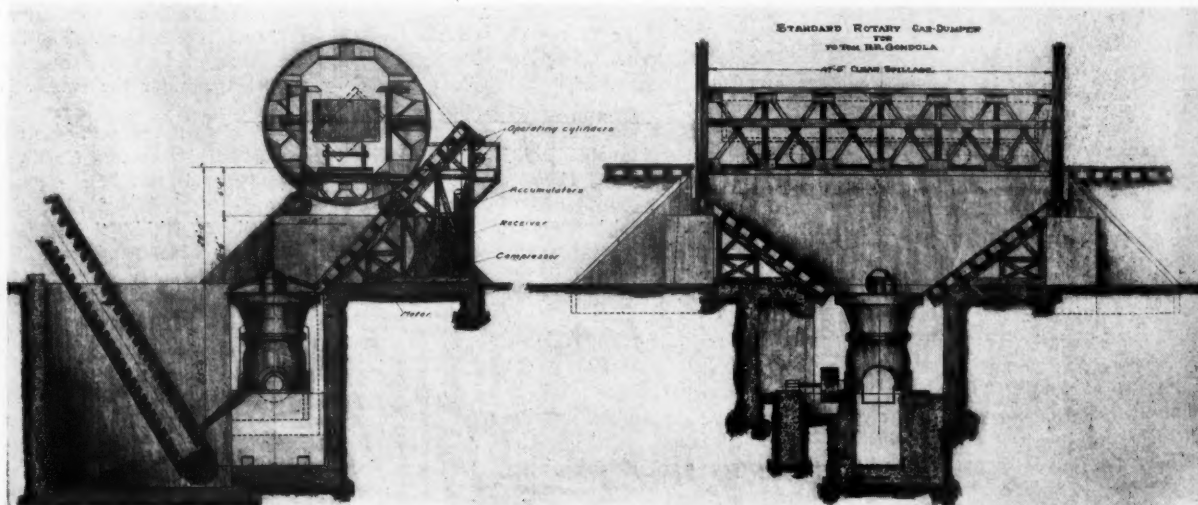
In the new installation, coal will be received in open-top cars and dumped into storage by a rotary car dumper. By means of elevators and drag conveyors the coal can be taken from storage and deposited to bins ahead of two coal driers. From here it will be fed to a battery of four mills for pulverization. It is then conveyed to bins ahead of the kilns. Provisions are included for three extra driers and four extra mills. Opposite the pulverized coal department there will be a new machine shop and a new store room.

The present power plant consists of four 325-hp. water tube boilers which gen-



#### WHERE THE STONE IS RECEIVED

*In this crushing plant at the Pyramid Portland Cement Co. is the rotary car dumper shown below, with a primary and secondary crusher, and bucket conveyors to reclaim the stone and the screens or carry it to storage*



#### UPSIDE DOWN IN HALF A MINUTE

*This rotary car dumper installed at the Pyramid plant turns the car upside down and back again in about 60 seconds. Loaded cars are pulled up the incline to the dumper by barneys. An illustration on the next page shows the installation*

erate the steam for two cross condensing engines running a 1000-kw. generator and a 200-kw. generator. A small 125-hp. steam engine direct connected to a generator is used exclusively for lighting purposes.

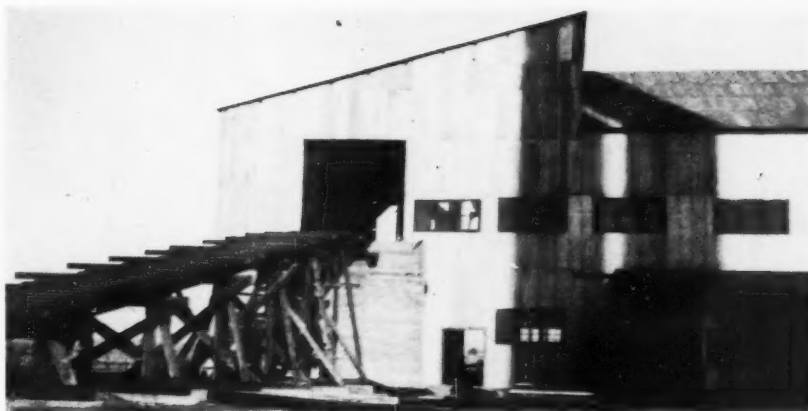
The Gilmore plant is so designed that a waste heat unit can be installed very easily and this is one of the contemplated projects of the company. The waste heat flue will be placed between the feed end of the kilns and the raw grinding departments and the boiler room adjacent to the stone storage. Ample space is provided for installing five waste heat boilers which will more than run the plant.

The old Ft. Dodge Portland Cement Corporation was organized in 1910, but did not start operations until 1917 and then as a result of the war the plant was practically at a standstill. However, in 1920 and 1921 the company did a big business and the outlook for 1922 is very good indeed.

The organization and personnel of the company is as follows: President, M. J. Nicholson; vice-president, L. H. Van Alstine; secretary-treasurer, H. S. Van Alstine; purchasing agent and general manager, H. W. Lanphere; chief engineer, C. W. Lanphere; and chemist, C. D. Holderman.

#### **New Pyramid Plant**

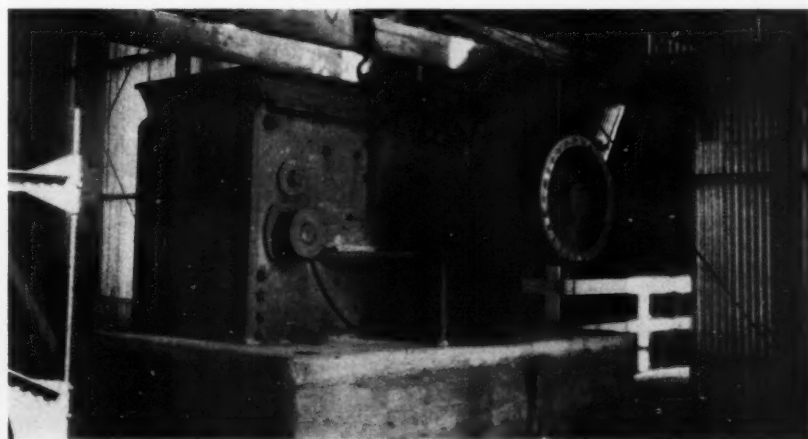
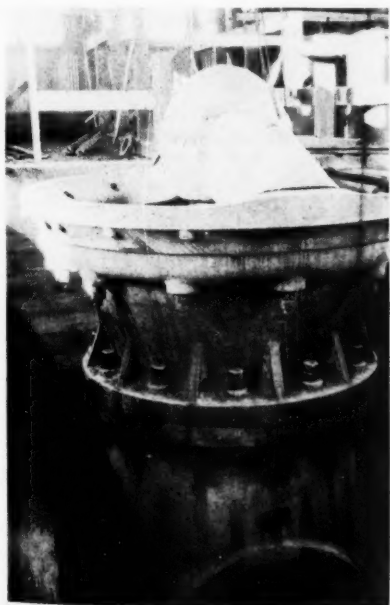
The Pyramid Portland Cement Co., of Des Moines, whose plant is now being constructed at Valley Junction, is one of the two new plants going up in Iowa. This plant is capitalized at \$2,000,000 and is under the guidance of a man who has devoted most of his life to the production of cement and one who has been connected with a number of cement plants,



*This trestle, not quite completed when the photograph was taken, is where cars are pulled up to the rotary car dumper to be unloaded into the crusher*



*The steel framework above is where the cars are placed to be dumped. Underneath, but not shown in the photograph, is the initial crusher*



#### **GETTING THE STONE DOWN TO SIZE**

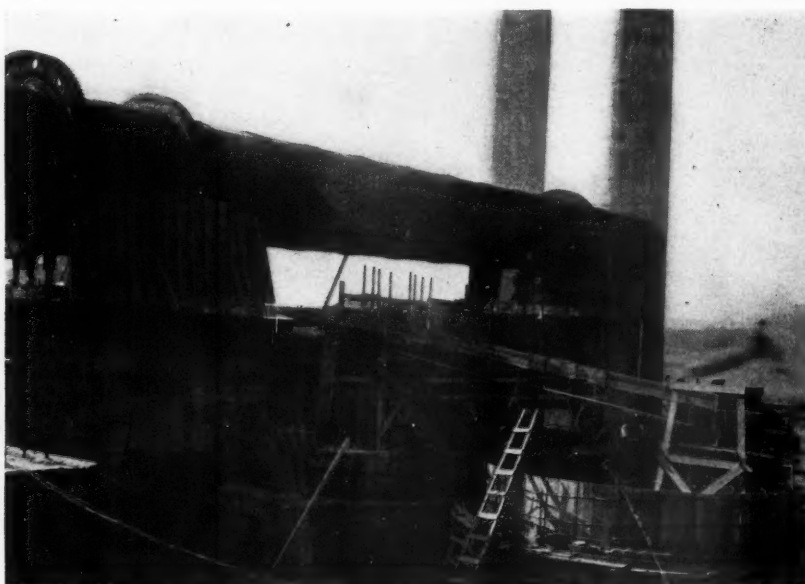
*At the left is the initial 36-in. gyratory crusher, which is set in a deep concrete pit and driven from a pulley on the main floor. The secondary crusher shown above is of the swing hammer type, and from it stone goes to the screens for commercial sizing or to cement stone storage*



*Limestone and clay are ground wet in this komi-nuter, two of which are used in the raw grinding*



*Under construction is this inside storage building, 78 ft. wide by 400 ft. long, which is to be covered with corrugated sheeting*



*Three of the slurry tanks shown here will be correcting basins, each holding 600 bbl., and a fourth, holding 700 bbl., will be a mix basin*



*Below the end of the 10x240-ft. kiln indicated by the arrow is the 7x70-ft. cooler through which the burned material is passed*

both in the United States and abroad. This man is E. Struckman, a brother of H. Struckman, president of the International Cement Corporation. E. Struckman is president of the Pyramid Portland Cement Co.

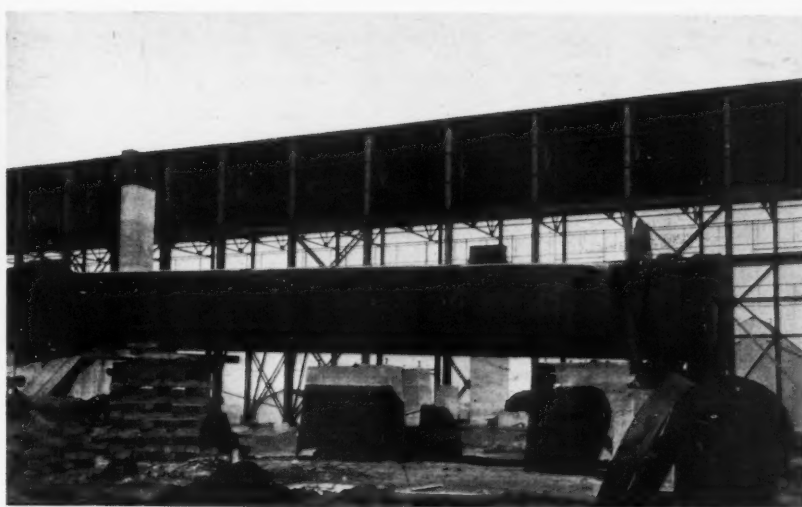
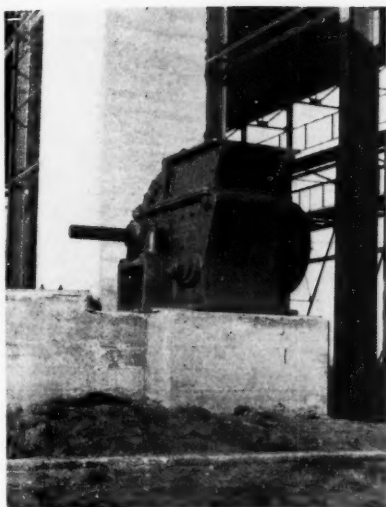
In selecting Valley Junction as a plant site a great many things were taken into consideration. In the first place Des Moines is a logical center from which cement can be distributed to a large territory; secondly, within immediate proximity of the plant site is located a good clay deposit. The quarry from which limestone is obtained is located at Gilmore City and has the same characteristics as the Gilmore Portland Cement Corporation quarry. The limestone extends to a depth of over 200 ft., has very little overburden, and analyzes over 98 per cent calcium carbonate.

Quarry operations at Gilmore City will consist of blasting out the rock and loading it into gondola cars. For these operations two well drills and a 100-ton Bucyrus shovel with a  $3\frac{1}{2}$ -yd. dipper will be used. The company's own locomotives will do the switching.

Limestone from Gilmore City will be shipped to Valley Junction in gondola cars, a distance of 100 miles. The company has secured a 20-year contract with the M. & St. L. railroad which will give them special rates on limestone shipped between these two points. Also, for the benefits which the mill will confer upon Valley Junction, that city has remitted the taxes of the Pyramid Portland Cement Co. for a period of 10 years.

While the construction of the plant is well under way, it is not possible at the present time to give a definite idea as to the flow sheet. The accompanying illustrations show the completed portions of the plant in February, 1922.

The only completed units thus far are the machine shop and the rock crushing plant. The structural steel work and the roof of the building which will hold the storage of stone, clay, clinker, gypsum,



#### COAL MUST BE PREPARED FOR BURNING

*The small pulverizer at the left grinds the coal before it passes through the 6x50-ft. coal drier at the right. There will be a drier for each of the kilns, and each drier has an automatic stoker*

and coal has been completed and is ready for the corrugated galvanized sheets.

When loaded cars of limestone reach the plant at Valley Junction they will be taken up an inclined tramway on one side of the crushing plant and put on a rotary car dumper. This equipment is set directly over the crusher. Cars will be handled by pneumatic-hydraulic controlled barneys. The car dumper itself is controlled by a 10-hp. motor and it dumps a 50-ton car with comparative ease. It is only necessary to overcome the initial torque to dump the car and contents.

The initial crushing will be done by a 36-in. gyratory crusher. It is set in a deep concrete pit and the crushed material is reclaimed by a bucket elevator 54 in. wide, 60 ft. centers, and inclined at an angle of 45 deg. The elevator deposits the crushed material to a steel hopper feeding a secondary crusher, of the swing hammer type. Another 54-in. bucket elevator reclaims the material from the crushers and deposits it to a hopper feeding the commercial stone screens. The screens are 5x30 ft., made up of a 12-ft. section with 1½-in. perforations, a 10-ft. section with 2-in. perforations, and an 8-ft. section with 3-in. perforations. There is also an 11-in. dust jacket with ¾-in. perforations. The sized stone from the screens is discharged to six bins below having a storage capacity of 300 tons each. This will be known as the commercial crushed stone department as the possibilities for the sale of crushed stone in Des Moines and its vicinity are exceedingly good. Stone required for cement manufacture will be taken on a belt conveyor and by means of a tripper deposited anywhere in the storage building. The crushing and screening plant is of steel construction throughout. The inside storage building will hold 20,000 tons of stone and clay and 100,000

bbl. of clinker, besides holding gypsum and coal.

After correct quantities of limestone and clay have been measured out, it will be delivered by conveyors and elevators to two kominuters where the material is ground wet. It is then delivered to one tube mill for final raw grinding. The ingredients are in the form of a slurry which is delivered to three correcting basins, holding 600 bbl. each. From the correcting basins it is transferred by gravity to a mix basin holding 2000 bbl. Slurry will be pumped by an air-lift pump to the storage basin under the kilns holding 2700 bbl. From there the kiln feed is pumped with slurry pumps. The kilns, of which

there are two, are 10 ft. in diameter and 240 ft. long, with an enlarged 60-ft. section at the firing end. This section is 11 ft. 3 in. in diameter and greatly increases the calcining efficiency of the kiln. The clinker from the kilns is discharged to 7x70-ft. coolers, from which it is belt conveyed to clinker storage where it is allowed to age. Each kiln has a 216-ft. reinforced concrete stack built by the Weber Chimney Corporation.

An overhead electric traveling crane, 78-ft. span, travels the entire length of the 400-ft. storage building. Gypsum is added to the clinker and the mass is discharged to three kominuters for initial finish grinding. From here it is conveyed



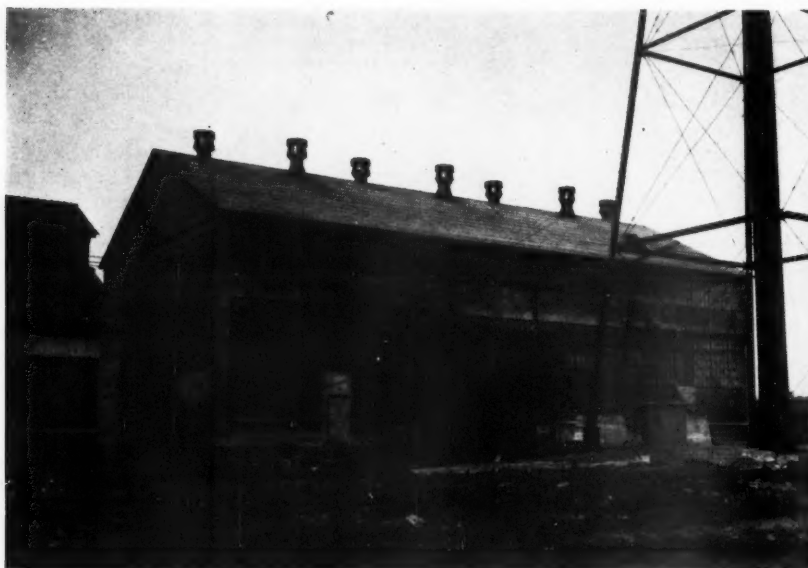
#### ONE OF IOWA'S NEWEST PLANTS

*The machine shop, store room, and power house were the only completed units of the Western States Portland Cement Co.'s plant at Davenport when this photograph was taken a few weeks ago. The plant capacity will be 5,000 bbl. a day*



#### **A FULLY EQUIPPED SHOP AND STORE ROOM**

*The machine shop and store room are equipped with lathes, drill presses, and other machines necessary for the construction and repair of much of the material used in building the plant. It has a 10-ton overhead traveling crane*

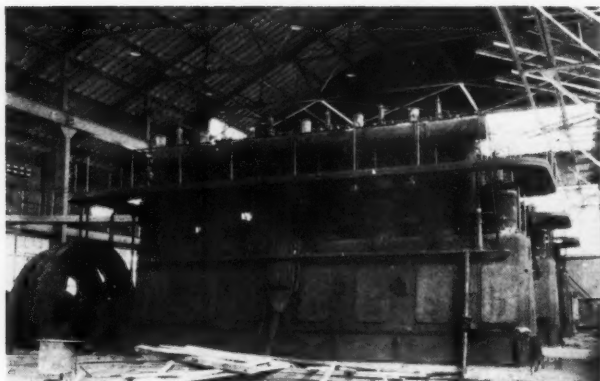


#### **A GLASSED-IN POWER HOUSE**

*The side walls of the power house are almost entirely of glass, to give a well-lighted and easy-to-work-in interior as shown below*

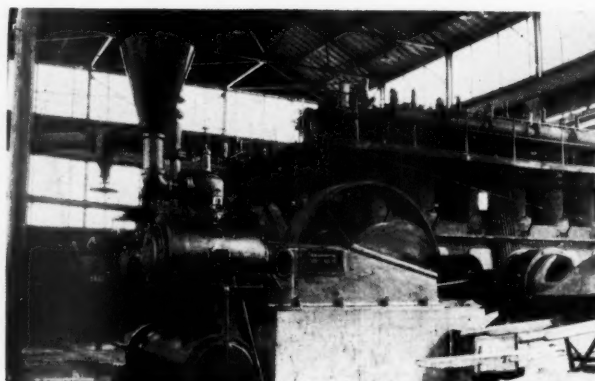
#### **SOME DETAILS OF THE NEWEST PLANT**

The accompanying views of the newest plant indicate the latest ideas in modern equipment and plan, and that the Western States Plant, designed to turn out 5000 bbl. a day, will be a model of its type in comprehensiveness and completeness—using the wet-process of manufacture. The operations at Davenport will begin in the fall of this year.



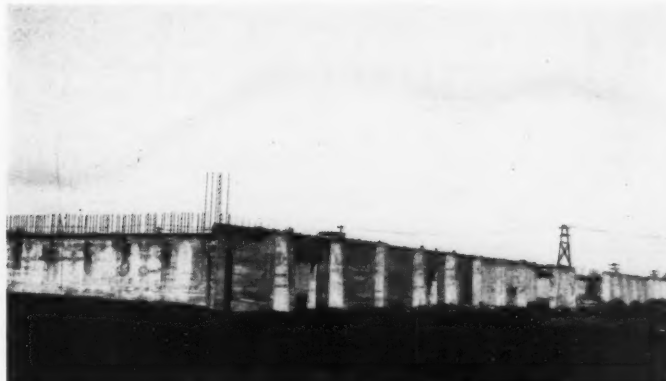
#### **DIESEL ENGINE POWER**

*This is one of three 1045-hp. Diesel engines which will furnish power to run the plant*



#### **MOTOR DRIVEN AIR COMPRESSOR**

*This motor driven air compressor will provide the compressed air necessary in many of the mill operations*



*This storage building, just being constructed, is 1100 ft. long by 80 ft. wide and will be entirely covered to protect the coal, clinker, clay, and gypsum which will be stored here. Two traveling cranes will handle the material*

to two tube mills for final grinding. The finished cement is then conveyed to the warehouse for sacking.

Coal will be crushed in a small Dixie pulverizer, after which it will be dried in a 6x50-ft. Cummur coal drier. Coal blower equipment has not been selected as yet.

The plant design provides a well concentrated plant, yet allows plenty of space for expansion. The grinding equipment is between the kilns and storage, and will require but a minimum of labor. A steel superstructure will be placed over the kiln and grinding departments and this will be entirely covered with corrugated galvanized sheets.

The plant will be entirely electrically operated by power furnished by the Des Moines Electric Co. It will be one of the feature plants of the country when completed and will have a capacity of 3000 bbl. of cement a day.

#### **Western States Plant at Davenport**

The latest addition to Iowa's cement resources is the new plant of the Western States Portland Cement Co., which is under construction just a few miles outside of Davenport. The home office is at Independence, Kans., where the company operates a 4000-bbl.-a-day cement plant. The plant at Davenport is expected to have a total capacity of 5000 bbl. of cement daily. Construction on this plant started in 1921. Reports of a week or two ago (near the end of April, 1922) were to the effect that construction work on the plant has been temporarily stopped. A. D. Stancliffe, general superintendent, is in charge of the work.

The Western States company owns 350 acres of land on the plant site. This property contains all the raw materials necessary for the manufacture of high-grade portland cement. Sufficient material is available to operate the plant about 50 years at the maximum capacity contemplated. The plant will use the wet process of manufacture.

The first permanent building to be

erected on the ground was the machine shop and store room. The machine shop is equipped with lathes, drill presses, and other machines necessary for the construction of much of the material used in the building of the mill. The machine shop and store room is equipped with a 10-ton hand operated overhead traveling crane. A spur track from the interurban railway line running to Davenport has been built into the store room and makes the convenient handling of supplies possible.

The power house is immediately back of the machine shop and is a building 60 ft. wide by 120 ft. long. It is equipped with a 10-ton electrically operated overhead traveling crane. The power plant consists of three 1045-hp. McIntosh & Seymour Diesel engines direct connected to 720-kw. generators and exciters. Above and to the side of the generators is a large switchboard gallery. An air compressor and a sump pump are also included in the power plant equipment.

A quarry has already been opened and a temporary crushing plant erected. For this work two shovels, a Thew and a Vulcan, and a 20-ton Ohio locomotive crane have been used. The quarry was opened by stripping off the list and shale. Fourteen Western 6-yd. standard gage side-dump cars and two Davenport locomotives were used for this work.

The permanent crushing plant will consist of a 36x60-in. Fairmount roll and a No. 9 Williams mill. The rock will be conveyed to a large inside storage. The storage building will house stone, clay, coal, and clinker and will be 1100 ft. long by 80 ft. wide. Two overhead electric traveling cranes will be used to distribute the materials in the storage building.

The kilns will be 220 ft. long and 10 ft. in diameter. There will be four kilns in all, each having a reinforced concrete stack approximately 200 ft. in height.

A large steel water tank with a capacity of 75,000 gal. has already been erected. A well has been sunk for drinking water,

while water for mill operations will be pumped from the Mississippi river, a half-mile distant, by electrically driven pumps. The company owns a mile of river front, with excellent wharfage facilities available, which can be utilized in moving cement when the river traffic has been developed.

The company has rail connections with the C. D. & M., an interurban line; the C., B. & Q.; C., M. & St. P., and the C., R. I. & P. railroads. The cement storage tanks and sack house will straddle the loading tracks.

A. W. Shulthis, of Independence, Kans., is president, and J. P. Rucker, of the same city, is secretary of the Western States Portland Cement Co. A. D. Stancliffe is general superintendent.

#### **Globe Portland Cement Co.**

The Globe Portland Cement Co., recently organized, will erect a dry process cement manufacturing plant four miles north of Dubuque, on the line of the Chicago, Milwaukee & St. Paul railroad. The plans have been prepared and the contractors chosen. The finished plant will have a capacity of 3000 bbl. per day, ultimately increased to 6000 bbl. About 300 men, mostly unskilled, will be employed.

Approximately \$1,500,000 will be spent on the buildings and equipment. The plant will be built on the shore of Lake Zollikoffer, where there is a source of supply of raw material, limestone, and shale, which is of very high grade, say the government and state geologists.

J. L. Nedderson of Minneapolis is president of the company, F. M. Miner is vice-president, director, and attorney, F. P. O'Malley is treasurer, and H. L. Johnson is secretary. Mr. Johnson was formerly connected with the Pyramid Portland Cement Co. as sales manager.

H. G. Lykken, Minneapolis, chief engineer in the Charles L. Pillsbury Co. organization, drew the plans for the plant and will supervise its construction.

# Making Prepared Gypsum Plaster

A compact, effective plant for manufacturing this product is described in the following article. The same company markets sand as a separate product in addition to its prepared gypsum plaster

THE use of gypsum plasters has expanded so rapidly that the normal tonnage is now in the neighborhood of 2,000,000 tons annually and this is used principally as a wall plaster. Gypsum wall plasters are used in the ordinary manner for covering walls and ceilings, being spread on metal or wood lath. They are also used for decorative moldings and panels, and since gypsum plaster is a poor conductor of heat and cold it is used as an insulating medium by being poured in plastic form into spaces provided in the construction of cold-storage buildings; for fire protection of steel frames of buildings by pouring it into forms surrounding the member to be covered; and for fire-stopping hollow places in combustible construction. All gypsum wall plasters, besides being wet with water, have other materials added to the calcined gypsum, either before sacking or just before wetting for use. These plasters, of which there are many brands, may be classed in three groups: gypsum cement plasters, wood fibre plasters, and prepared plaster.

The King's Crown Plaster Co. of Cedar Rapids, Iowa, is one of the few plants engaging in the manufacture of gypsum plasters that do not calcine its own gypsum. It buys the gypsum, adds the necessary ingredients, and markets the product in the following forms: cement and wood fibre, sanded or unsanded.

A cement plaster is made of calcined gypsum, hair retarders and fillers that add "slip" or working qualities to the materials. Cement plaster is neat and requires the addition of two or three parts of sand to make it workable. It is commonly used for a base coat. The King's Crown Plaster Co. manufactures this product, sanded or unsanded. The sanded product re-

quires only the addition of water and it is ready for the job.

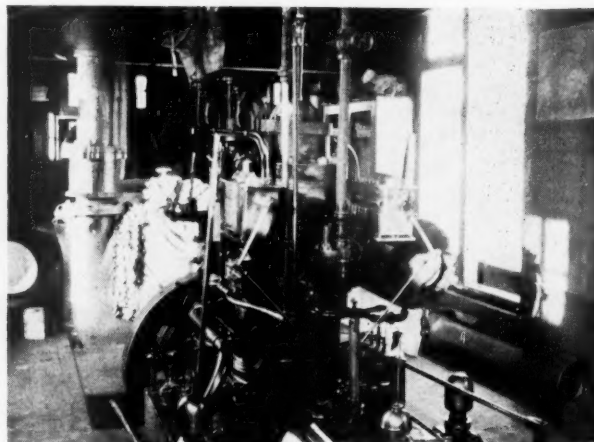
Wood fibre plaster differs from cement plaster both in composition and use. Cut wood fibre is used instead of hair for a binder, and as the plaster is designed for use generally without sand, ingredients are added to overcome stickiness; in cement plaster the added sand takes care of this.



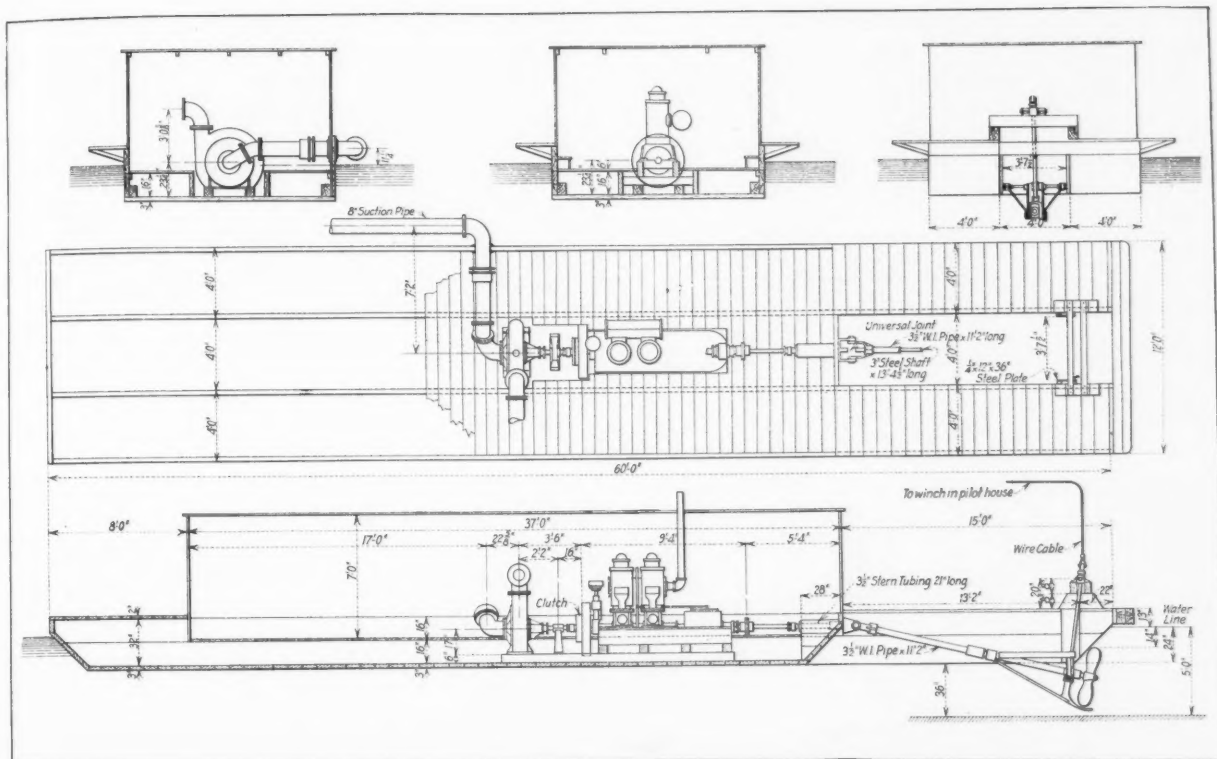
*This concrete block structure houses the plaster-making equipment of the King's Crown Plaster Co. On the first floor are the sand drier, the mixing, sacking, and wood fibre machines, and finished storage. The second floor has raw gypsum, prepared fibre, picked hair, and scales and hoppers for preparing batches, while the third story addition contains the hair-picking machine, sand screen, and sand storage*



*Sand for the plaster—and for a separate trade in sand, as well—is taken from the Cedar river by the dredge, and transported by the barges, shown here*



*This 60-hp. crude oil engine drives the barge as the drawing on the next page indicates. The same engine operates the centrifugal pump which takes sand from the river*



**The barge, driven by the crude oil engine, has its propeller protected from obstructions and from river bottom in shallow water as the drawing above shows. A universal joint in the propeller shaft makes the raising and lowering of the propeller possible**

Wood fibre plaster is popular in localities where good sand is not obtainable economically and also for the purposes that make lightness, toughness, and insulating qualities desirable.

A prepared or sanded plaster is identical to the cement plaster described above, except that sand is added at the mill rather than the place of use. The use of sanded plaster is not economical where freight rates amount to more than the value of the sand, but the advantages are uniformity and also elimination of over-sanding of the plaster.

#### **Dredging the Sand**

The sand is obtained from the Cedar river and is of an excellent quality not only for plaster purposes but for all general purposes sand is put to. The river equipment consists of a combined sand dredge and power boat and three barges on which sand is loaded. The combined power boat and sand dredge is 60x12 ft. and draws 48 in. of water; the sand is dredged out of the river by an 8-in. centrifugal pump direct connected to a 50-60 hp. Kahlenberg heavy duty crude oil engine. The interesting feature of this installation is that a propeller shaft is also run from the engine by means of a universal joint, which allows for raising or lowering the propeller as the case may necessitate. The accompanying drawing shows that the pro-

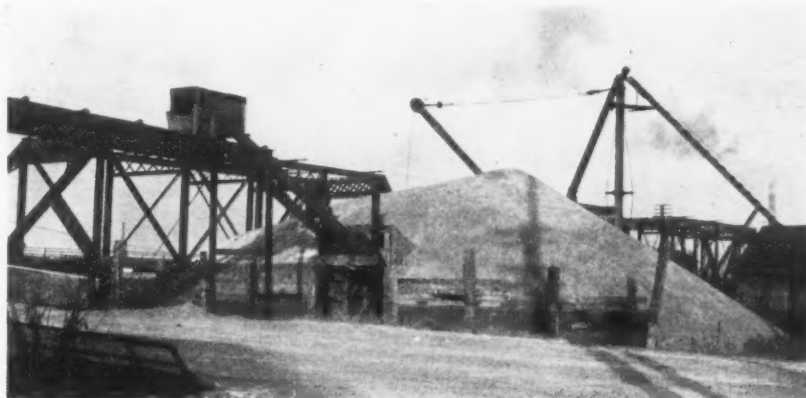
peller has a shoe underneath which prevents the propeller blades from striking bottom. The propeller and shoes rise automatically when they hit an obstruction or when in shallow water. This has been a means of preventing broken blades.

Another interesting feature of the installation is that the discharge pipe of the pump rises high enough from it to allow for a 10-in. slip-joint before the elbow turns the pipe to the horizontal position. The slip joint gives no breakage trouble and gives ample headroom to allow swing-

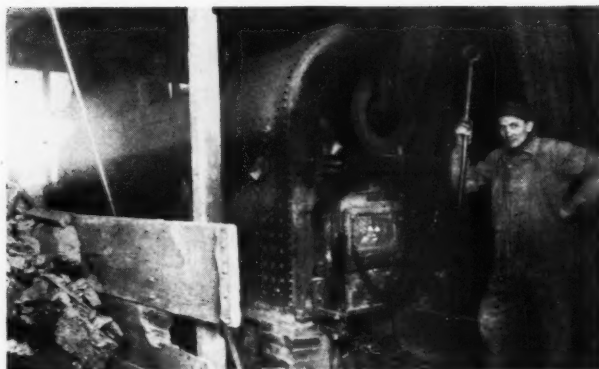
ing the discharge side to either side of the dredge.

The operation of the entire boat is controlled by the pilot, who has a system of levers at the wheel which will control the engine, pumps, and derrick. The barges on which the sand is boarded are 18x80 ft. and draw 52 in. of water when loaded; each barge has a capacity of from 60 to 70 cu. yd. of sand.

The sand dredge operates about three miles up the Cedar river from the plant and the round trip, including loading the



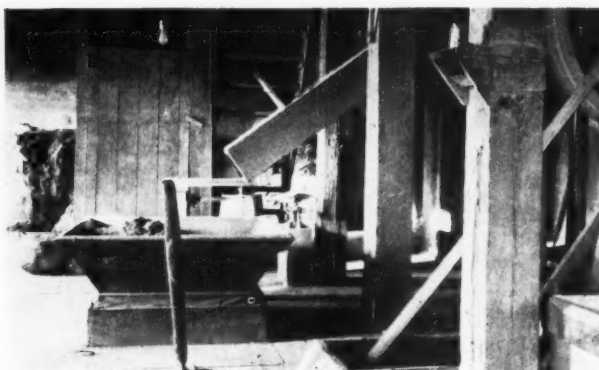
**A derrick and clamshell bucket unloads sand at the plaster plant to a ground storage pile, from which it feeds through a hopper to a belt conveyor when loaded; the trestle shown at the left, going direct to the plant**



*This sand drier is a home-made affair, consisting of a 12-in. cylinder revolving on roller trunnions in an old locomotive boiler, the flues of which have been removed*



*The basswood at the left is for making wood fiber in the machine shown. The blower delivers the cut fiber to storage on the second floor*



*This batch hopper in which ingredients are mixed is mounted on scales so that each material is weighed as it is added. The chute shown is from the sand storage*



*From the batch hoppers shown at the left the materials discharge into the mixers and sackers shown here. The sacked material is ready for shipment or for storage*

barges, takes about 2½ hr. The loading time for each barge is approximately 30 min. and three men constitute the loading gang.

The barges may be unloaded at one of two points—one point being located 1½ miles up the Cedar river from the plaster plant. This point is for railroad shipping, where the yard is capable of accommodating 14 cars at one spotting. The equipment consists of a stifle derrick with a 1¼-cu. yd. clamshell bucket operated by a 50-hp. motor. The derrick unloads from barges direct into cars.

The second unloading point is at the plaster plant proper. Here also the sand is unloaded from the barges by a stifle derrick with a 1-cu. yd. clamshell bucket operated by a 35-hp. motor. The sand is unloaded from the barges to a ground storage pile. For city trade the clamshell loads into a bunker of 40-cu. yd. capacity, from which wagons and trucks are loaded.

For conveying sand from ground storage to storage at the plaster plant, the material is put on a 20-in. belt conveyor by a feeder located in a tunnel underneath the ground storage pile. The belt conveyor rises on a trestle and is equipped with an automatic tripper so that sand can be stored

on the ground outside of the plaster plant or in the storage room in the plaster plant. The conveyor belt trestle is so constructed as to allow for loading railway cars should anything happen to the regular loading point up the river.

#### **Making the Plaster**

The plaster plant is a two-story concrete block building with an additional shall, frame construction third story. On the first story are located the sacking machines, mixing machines, wood fibre machine, storage for finished product, and the sand drier. The second floor contains the raw gypsum, prepared wood fibre, picked hair and scales and hoppers for preparing the batches. The third story addition contains the hair-picking machine, sand screen and sand storage.

The sand from the plaster mill storage is reclaimed by a 4x6-in. bucket elevator which discharges into the feed hopper of the sand drier. The drier was conceived and built by the company and consists of a 12-in. cylinder, revolving on roller trunnions through an old locomotive boiler, the flues of which have been removed. The products of combustion do not come in direct contact with the sand and so this is really an

indirect heat form of drier. The revolving cylinder has the proper pitch so that the sand is discharged to an elevator boot where it is taken up by another 4x6-in. bucket elevator and discharged to a spout feeding a cylindrical screen with ¼-in. meshes. The screen is 18 in. wide and 14 in. in diameter. The fine sand is discharged to a hopper below, while the coarse sand is chuted to a spout which discharges the material to a ground storage outside of the plaster mill building.

The hopper in which the batches are prepared is mounted on a scale, and so each ingredient entering into the plaster is accurately determined by weight. The second floor contains two hoppers, one for sand mixtures and one for neat mixtures. The hopper can handle a 2000-lb. batch.

The raw (calcined) gypsum is received on the first floor and then elevated to the second floor by a sack conveyor where it is stored until needed. The wood fibre machine on the first floor cuts the basswood and it is then blown to storage and the curing room on the second floor by a No. 8 Bucyrus blower. As the wood fibre is needed for batches it is taken out of storage in bushel baskets. The hair is picked on the third floor and dropped to storage

on the second floor. It is handled in the same manner as the wood fibre.

Immediately below the batch hoppers are located the mixers and sackers. A batch is discharged to the mixer from which it goes to the sacker. After sacking, the material is loaded in cars for shipment or

stored in the warehouse.

Besides the prepared plaster and sand business, the King's Crown Plaster Co. engages in the manufacture of concrete blocks and in the building supply business. The company is a member of the Iowa Sand and Gravel Producers' Association,

Iowa Builders' Supply Association and National Builders' Supply Association. William King is president of the company; J. W. Pichner, secretary-treasurer and general manager; M. L. Shipper, superintendent of river operations; and Frank Janda, mill and yard foreman.

## Blasting 110,000 Tons of Rock

A SHORT time ago the Charles Stone Co., at Marion, Ill., who are large quarriers of railroad ballast, agricultural limestone and concrete and fluxing stone, set off a blast the details of which are interesting.

This company operates on a high bluff, the face of which is 1500 ft. long, and at

Charles, there is no doubt but what the fall will show in excess of 110,000 tons.

The stone will be used for railroad ballast, fluxing, paving highways, and general concrete work, and a considerable portion of the stone will be disposed of for improvement of the soil throughout southern Illinois.



*Condition of the bluff before the shot was fired*

the point where the shot was made the bluff was 118 ft. high and 350 ft. long. The illustrations give a very good idea of the bluff and its condition both before and after the blast.

With a clipper well drill 6-in. holes were drilled, spaced 15 ft. apart and from 28 to 35 ft. back from the face and the holes were 118 ft. deep. There were 22 holes in all.

Countered Cordeau-Bickford explosives was employed and discharged with an exploder and blasting machine. There were used 9000 lb. of explosive of 60 per cent and 11,200 lb. of 40 per cent. The 60 per cent explosive was placed in the bottom of the holes in order to kick out the bottom ledge and clear the floor.

In loading the holes the operation was started in the morning at about 7 o'clock and the shot was made at 3 o'clock that afternoon. It was estimated that 90,000 tons of stone would be secured from this shot, but on account of the very satisfactory condition of all the holes, even more stone was brought down. When this shot is cleaned up, said General Manager



*After the blast of more than 20,000 lb. of Cordeau-Bickford explosive*

### Henry "Is at It Again" with a New Secret

ACCORDING to W. B. Mayo, chief engineer for Henry Ford, fertilizer can be made cheaper under a new secret process which it is planned to use for commercial purposes at the government nitrate plants at Muscle Shoals.

### Lime Cartoonettes

COPIES of the Construction Lime Cartoonette, illustrating and describing the technical bulletins issued by the National



*"Sitting Pretty"*

Lime Association on the uses of lime in construction, have been distributed to all lime manufacturers who are members of the association.

Copies of all the bulletins listed in this cartoonette can be obtained from practically all lime manufacturers or direct from the association, announces Chief Clerk W. A. Kinney. Here is one of the cartoons. It serves the purpose of gaining attention to a valuable bulletin which might otherwise fail at first glance to secure the appeal it deserves.

## Hints and Helps for Superintendents

### Three-Size Mixtures That Are Really Mixed

TO get a mixture of two or three sizes of gravel or crushed stone, or a mixture where gravel and crushed material is put together, the Arrow Sand and Gravel Co., has an unusual bin construc-

tion. With the eight circular and three intermediate bins, 6 combinations of three materials each and 12 combinations of two materials each can be made in any proportion.

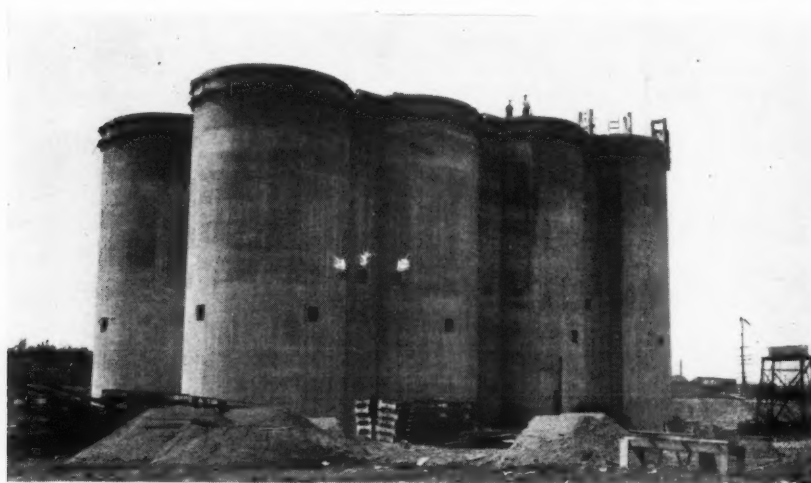
### Handling Wire Rope

IN the proper method of handling wire rope the reel should be set on a shaft and rotated, or should be rolled along the ground. Never throw the reel on its side and pull loops off the side; to do this will cause kinks. The coil should be rolled along the ground or set on a swift so that it can be rotated, says the *Iron Age*. Never pull loops from the coil. This will also cause kinks.

Lang lay ropes should never be wound directly from the reel or coil to the drum; lay the rope out full length, if possible, or set the reel or coil as far from the drum as possible. A Lang lay rope is more springy than a regular lay and should be carefully installed, always keeping a tension on the rope.

### Making Use of Old Boilers

WHEN a boiler has outlived its usefulness as a boiler, or when state inspectors condemn it for further use, there



*This view, taken during construction, shows the regular bin openings and also—indicated by the arrows—the special opening for three-size combinations*

tion and an unusual arrangement of spouts.

A double row of circular concrete bins, four to a row, were constructed close together, and the nearest points of the adjacent bins connected with a concrete wall. This formed, in addition to the circular bins, three eight sided intermediate bins, four sides of each of these intermediate bins are straight, formed by the short connecting walls, and the other four sides are convex, formed by quarter-circumference arcs of four different circular bins.

The circular bins are 20 ft. in inside diameter and 54 ft. high. The capacity of each is about 1000 tons, and the capacity of each intermediate bin is approximately the same. By forming these three extra bins space ordinarily wasted has been utilized and the storage capacity increased nearly 40 per cent, all with very little increase in cost. But more important than both of these results is the proportioning of sizes which is made possible. The two illustrations show the usual openings from the sides of the circular bins closest to the loading track. Then about 6 ft. higher come from each intermediate bin, a spout, with spouts from the

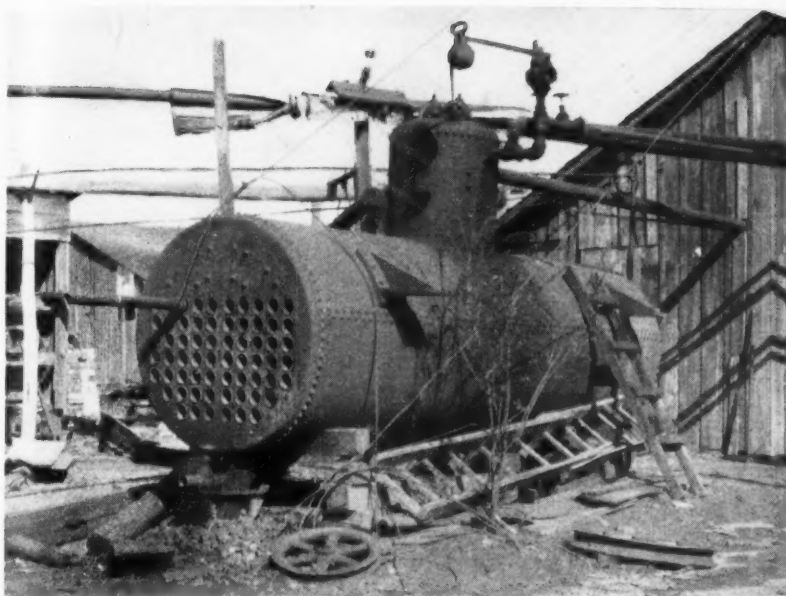


*The upper spouts, one from the intermediate bin and one from each adjacent circular bin, secures thorough mixture of any three sizes in any desired proportions*

or round, can be made in any desired proportion by varying the gate openings from the three bins. And since material from all three spouts falls together on the same spot, the mixing is thoroughly accomplished during the process of load-

ing. With the eight circular and three intermediate bins, 6 combinations of three materials each and 12 combinations of two materials each can be made in any proportion.

In the Pennsylvania slate fields two or three producers have fitted up old boilers



*This boiler, condemned for further use as a boiler, has been transformed into a receiver for compressed air and serves the purpose well*

for this purpose. Much air drilling and air channeling are necessary in taking out the slate without shattering it, and when any leaks have been repaired in the old boiler it makes a serviceable receiver for the compressed air used in the drills and channeling machines.

The illustration shows an old boiler which has been fitted up at the North Bangor Slate Co.'s quarry at North Bangor, Pa. This company has three small compressors, all of which may be put in operation in case of a specially heavy demand for air. Ordinarily one or two compressors are sufficient for the quarry operations, and the use of three compressors makes it practically certain that no delays will result from compressor breakdowns, because if one breaks down there are still two left. This is important, because quarrying would practically come to a standstill the moment the supply of air stopped. The three compressors deliver to the improvised receiver, and from it lines are run down into the quarry and to the various drilling operations on the surface.

### Investigations of Whitewashes and Aqueous Lime Paints

RESULTS are given by G. J. Fink of the Research Laboratory of the National Lime Association on the development of whitewashes and aqueous lime paints which involved exposure tests of 175 formulas. Definite data and pictures are presented showing the effects of a large number of ingredients in various combinations, and conclusions given

regarding the relative merits of the various formulas.

Of the siccatives used, those such as casein, which with lime form insoluble films, proved to be the best, while those which are water-soluble such as glues are not so satisfactory for exteriors. Several alkaline salts were used for accelerating the solution of casein, trisodium phosphate proving to be the most satisfactory. Among the additional agents used with lime in mixtures containing no definite siccative, alum and table salt were effective on improving the workability and permanence of the whitewashes. Several formulas developed and tested are shown to be superior to most of those in common use.

### Standardization of Non-Metallic Mineral Products

THE broad field of mineral fillers is sadly lacking standardization, according to Oliver Bowles, mineral technologist of the Bureau of Mines. Many users of mineral materials have very indefinite knowledge of their requirements either in color, grain size, grain shape or chemical composition. The standardization of fillers is practically an untouched field, and such standardization accomplished through a comprehensive study of the subject would not only promote better manufacturing processes, but would be of material benefit to producers. It is claimed by one producer that the cost of purchasing special screens to satisfy the requirements for odd sizes of his finished product for one customer destroys most

of the profit obtained from grinding roofing grade talc.

Granite paving blocks are manufactured in a great variety of sizes, says Mr. Bowles. Eleven varieties, sold under trade names, were reported in 1917, and many other varieties were sold by sizes only. The state of Maine reported seven different sizes, New York seven, Massachusetts 10 and other states a varying number. Undoubtedly some latitude should be allowed in paving block dimensions, particularly in length, but too great a complexity is involved both in manufacturing and in street construction, where every state or city writes its specifications without regard to the requirements of other localities.

Elutriative tests have been made at the Southern Experiment Station of the Bureau of Mines, Birmingham, Ala., on certain materials, such as silica, tripoli, bentonite, fuller's earth waste, infusorial earth, ocher, slate flour, whiting, talc, pyrophyllite, and mixtures of non-metallic minerals. Microscopic slides have been made for the purpose of counting the grains. An air separator has been devised for the classification of finely ground materials.

### Potash in 1921

MORE than 18,200 short tons of crude potash salts containing 7,618 short tons of  $K_2O$ , were produced in the United States in 1921 from domestic sources, according to the Geological Survey. This potash was produced at 17 plants by 15 companies, and about 79.5 per cent of it was extracted from natural brines. Three other companies produced considerable potash in 1921, but they have not yet returned their schedules. The annual production from domestic material was less in 1921 than in any other year since 1915.

Twenty-one plants made sales amounting to 8,907 short tons of crude material containing 3,895 short tons of  $K_2O$ , valued at point of shipment at \$383,218, and 24 plants reported stocks on hand amounting to 26,461 tons of crude material containing 10,348 short tons of  $K_2O$ . Sales and stocks on hand are reported by several companies that did not produce potash in 1921.

The domestic potash produced in 1921 was made from natural brines, dusts from cement mills and blast furnaces; and wastes from molasses distilleries and from sugar refineries that employ the Steffens process. No production has been reported from alunite, silicate rocks, kelp, or wood ashes. The only plants reporting continuous operation during the year were several that produce potash from the dusts of cement mills and blast furnaces. The inactivity of the fertilizer market and the low price of foreign potash are given as reasons for nonproduction.

# A Modern Japanese Cement Plant

This second and concluding installment further describes the cement plant of the Asano Cement Company, at Kawasaki, Japan. This company has built a plant that is the acme of that country's extensive industrial development

IN the April 22 issue of ROCK PRODUCTS the cement plant of the Asano Cement Co. at Kawasaki, Japan, was described together with this company's early start. The plant today compares favorably with the most modern cement plants of the world.

## Kilns and Coolers

Underneath each kiln feed tank is located a 7-in.  $\frac{1}{2}$  pitch screw conveyor, which, in turn feeds a 9-in. water-jacketed screw conveyor running through the dust chamber at the head end of the kilns. The speed of both screw conveyors is controlled by means of a No. 2 Reeves speeder. The material through the water-jacketed screw conveyor is fed into two Allis-Chalmers kilns, which are 9 ft. in diameter and 200 ft. long. The dust from

the dust chamber is reclaimed by means of a screw conveyor to an elevator which deposits it for re-mixing in the correction tanks.

The material discharging from the kilns drops into two 8-ft.x60-ft. coolers through a cast-iron spout supported by a brick pier. As the clinker discharges from the coolers it is reclaimed by bucket elevators and deposited on a 24-in. drop pan conveyor, which distributes the clinker over the clinker storage.

The company is installing waste-heat boilers at the present time.

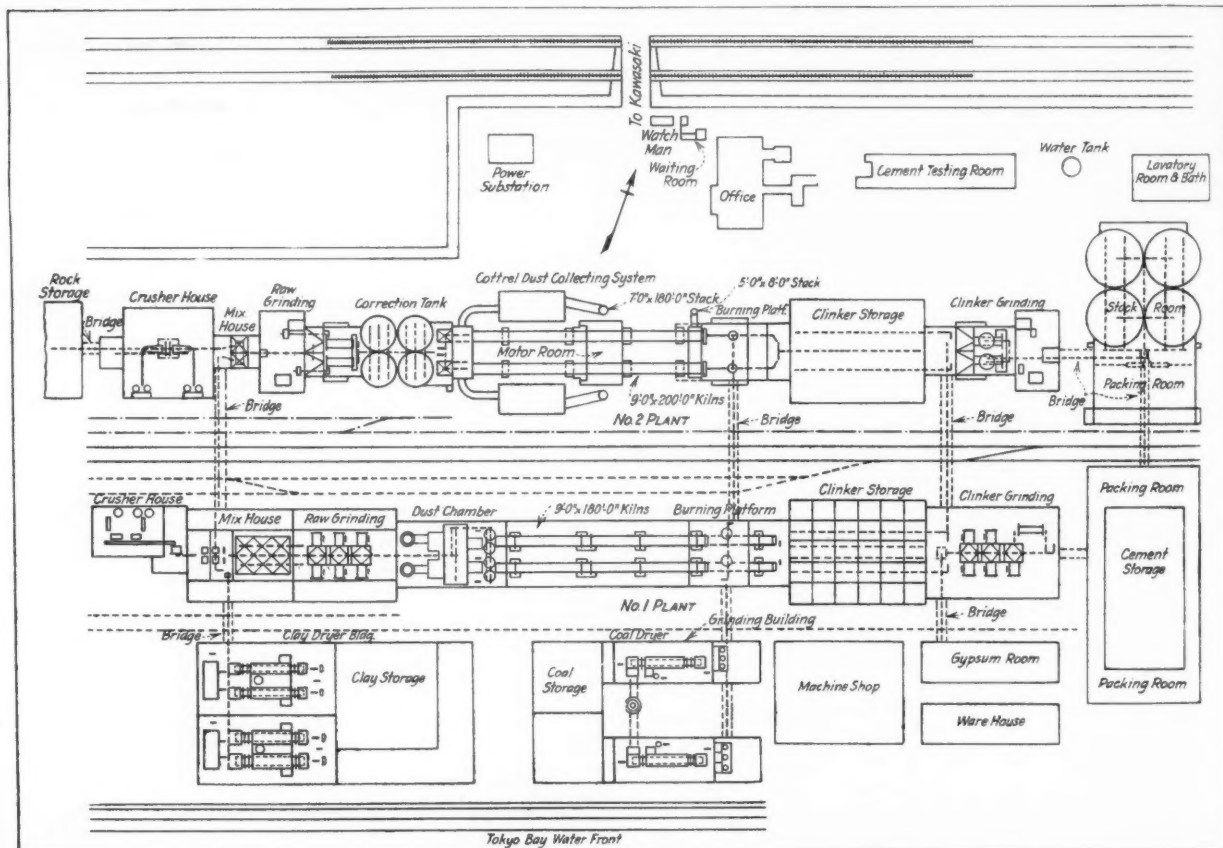
## Coal Mill

The coal is brought to the plant in boats from Yokohama and at present loaded by coolies, each carrying two small

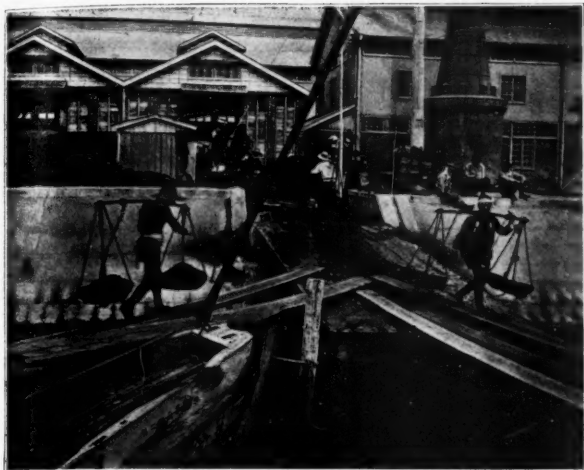
baskets supported by a yoke over his shoulder. This is illustrated in some of the accompanying photographs.

The coal in the baskets is set on a platform scale by the coolies, and the attendant at the scale either adds to or takes away enough coal to make the scale balance. He then records the amount and in this way records are kept of the exact amount of coal used. The coal is then dumped into the coal storage at Plant No. 1. Here again, the coal is loaded into wheelbarrows and taken by coolies to a hopper feeding a bucket elevator which deposits the coal to a coal bin situated at the head of the coal dryer.

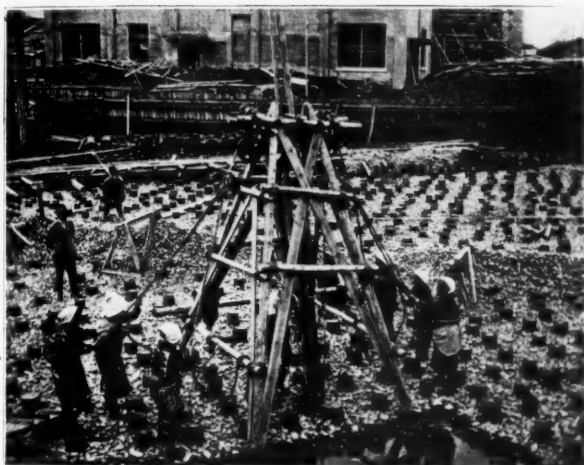
The coal is fed to the dryer from the coal bin through an 18-in. reciprocating feeder. The coal drier is 6x60-ft. indirect



General layout of plants Nos. 1 and 2 of the Asano Cement Co. at Kawasaki, Japan



*Method of unloading and conveying coal to the cement plant*



*Coolie women were employed in driving the piles*



*The kilns, looking toward the correction tanks*

heat type, stoker-fired. As the coal is discharged from the dryer it is reclaimed by a bucket elevator and distributed over three coal bins ahead of three 42-in. Fuller pulverizing mills. There are two dryers used and consequently six pulverizing mills. From the Fuller mills the pulverized coal is elevated and conveyed to the pulverized coal bin located on the burning platform. The pulverized coal is fed from each bin by two 6-in. screws, which discharge into an Allis-Chalmers coal injector, and it is then picked up by air furnished by a No. 10 American blower and discharged into the kilns.

#### **Clinker Storage**

The clinker storage, which is illustrated by accompanying photographs and drawings, is built entirely of reinforced concrete. The roof over the storage is of the three-hinged arch type, the arches being of special design. There is a total capacity of 68,400 bbl. The building is 48 ft. high and 90 ft. across centers.

#### **Clinker Grinding**

On reclaiming the clinker it is drawn through V-shaped openings in the roof of the tunnels underneath the clinker storage onto two 24-in. belt conveyors discharging into two elevators which deposit the clinker into two clinker bins ahead of two No. 724 Allis-Chalmers compeb mills. The clinker bins have a total capacity of 2,767 bbl.

The gypsum is conveyed over from a storage in Plant No. 1 and deposited in a gypsum bin of 18 tons capacity located in the clinker storage grinding room directly over the incoming belts from the clinker storage by a feeder, which is belt-driven from the head end of the belt conveyor. The amount of gypsum being fed is regulated by clinker scales.

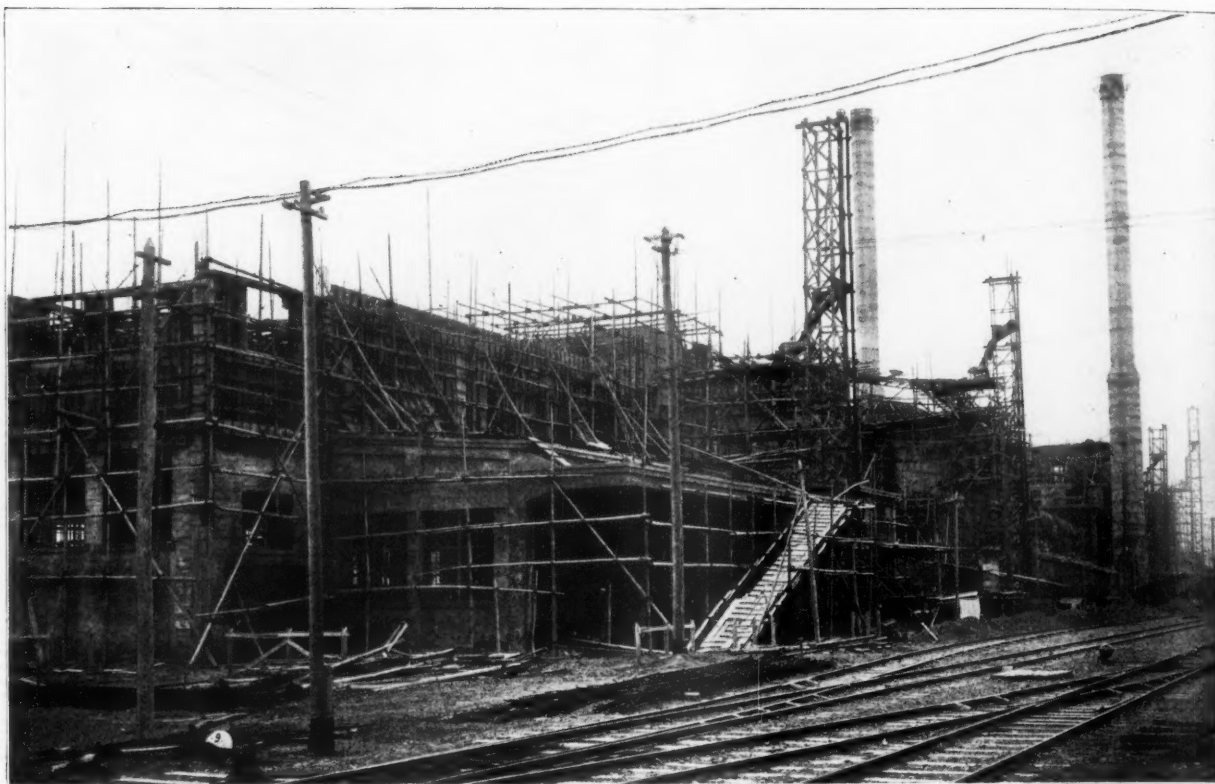
The material from the clinker bins is fed into two Allis-Chalmers No. 724 compeb mills through style "B" feeders. As the pulverized clinker leaves the compeb mill it is reclaimed by an elevator which sends it to the stock house.

#### **Storage and Packing**

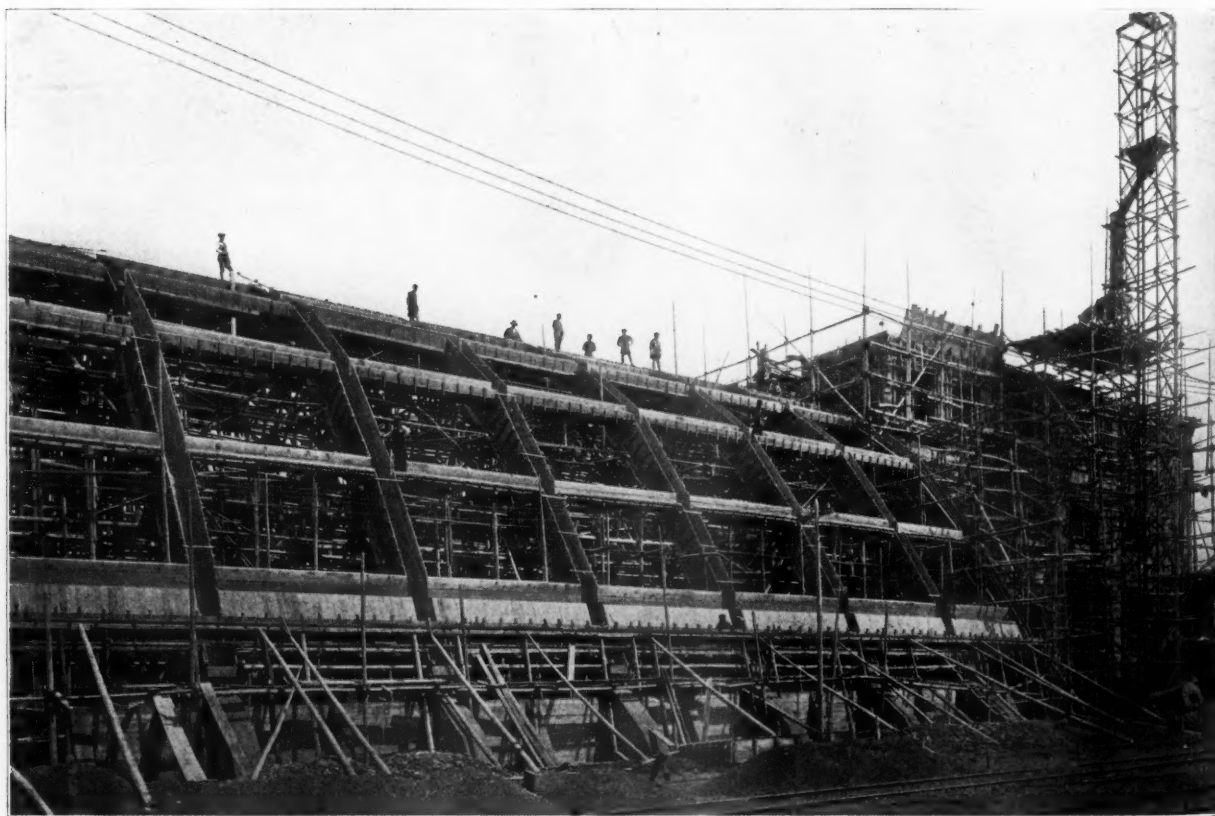
The cement conveyor from the compeb mills discharges into an elevator which in turn discharges into a 16-in. screw conveyor over the stockhouse. This conveyor distributes its material to any one of four reinforced concrete silos, 50 ft. in diameter and 50 ft. high, having a capacity of 25,000 bbl. of cement each.

As the material is required for packing it is drawn from under the silos into screw conveyors, which deposit it in an elevator. This elevator then spouts the material to two revolving screens. The fines from this screen are conveyed to the packing bin located above the barrel packers.

Until now nearly all the cement in Japan has been packed in wooden barrels and 10 barrel packers and one 4-tube Bates valve bag packer have been installed in this plant. The cement is fed to the barrels from the bin by means of a revolving feeder. The barrel is set on an iron disc or platform, which is vibrated



*Crusher house looking toward the kilns during the process of erection*



*Another scene when the building had reached a further stage in its erection*



*How the coal is weighed*

from a line shaft underneath by means of cogs of different pitch. This causes the cement to settle so that the required quantity may be put in the barrel (380 lb.). When packed in bags, the bags weigh 95 lb. each. From the packing room the barreled cement is loaded into cars.

#### **Power Plant**

The plant is electrically-driven throughout. The power is purchased from a hydro-electric company also owned by Mr. Asano and received at a sub-station on the company's property. All motors over 50 hp. are three-phase, 50-cycle, 3,300-v., alternating current. The small motors are three-phase, 50-cycle, 500-v.

The cement plant itself is located on reclaimed ground, for prior to the time of filling in the land the property at high tide was completely under water. The property on which the plant stands covers some 100,000 tsubi (about 80 acres) and it required approximately 30,000 cubic tsubi (240,000 cu. yds.) for filling in.

In building this Plant No. 2, it is interesting to note that there was required 833 tons of steel, 14,400 yd. of concrete, and 22,600 bbl. of cement. The machinery foundation alone required 3,500 yd. of concrete.

#### **Statistics of Japanese Cement**

In 1917 the total production of cement in Japan was 4,400,000 bbl., and of this the Asano Cement Co. produced 1,944,000 bbl. or approximately half of the entire output of Japan. The Asano Cement Co. has seven plants in Japan, two at Hokkaido, one at Tokyo, two at Kawasaki, one at Moji, and one at Formosa. These plants are the most modern in the Far East. Mr. Asano has installed modern grinding units in all of his plants and has thereby increased the capacity and cut the costs at his plants considerably. The new No. 2 plant at Hokkaido is also of reinforced concrete, of 1,800 bbl. capacity, and was built along the same lines and at the same time as the Kawasaki plant.

Another recent and very important change is the installation of a crushing plant at the quarry. The rock is crushed in a No. 8 gyratory crusher. The cars are brought underneath a bin and loaded by gravity instead of hand.

#### **Cement Specifications Advanced to Standard**

THE "Specifications and Tests for Portland Cement," for which the American Society for Testing Materials is sponsor, have been advanced to the full status of "American Standards" by the American Engineering Standards Committee.

These cement specifications, which have been developed as a result of the experience of the industry through several years, were first approved by the A. E. S. C. as "Tentative American Standard" in 1919. They were reapproved in 1921 after agreements had been reached which eliminated slight differences between the government and the commercial specifications, resulting in nationally recognized uniform specifications.

#### **Illinois Commerce Commission Restored to Power**

THE Interstate Commerce Commission on April 20 discontinued Case No. 11703 (intrastate rates within Illinois) and vacated and set aside its orders in that case by means of which it brought the Illinois rates on freight, and milk and cream to the Ex Parte 74 level.

By this action the Illinois Commerce Commission has been restored to the power over Illinois intrastate rates which it lost when its predecessor, the Public Utilities Commission, forbade the carriers to raise the intrastate rates to the level ordered by the national body in Ex Parte 74.



*These two views illustrate the native method of hauling and pouring the concrete*

# Grading and Measuring Concrete Aggregates

Rigid specifications for concrete aggregates may bring satisfactory results, but the concrete is likely to be far from economical. The lack of tolerance in specifications is more harmful than beneficial, as the author explained to the Illinois Concrete Aggregate Association

By R. C. Yeoman

Extension Engineer, Indiana Sand and Gravel Producers' Association

THE development of specifications and the methods of handling sand and gravel for road and building work have been given a great deal of attention by the Indiana Sand and Gravel Association. There are two reasons for this: Indiana has not only widespread deposits of sand and gravel, but considerable variation in the character and grading of materials, so that a single rigid specification could not be designed to cover conditions in the whole state. The second reason for our interest in this matter was an attempt to put over such a rigid specification. The state and county officials were sincere in the promotion of a rigid specification which had been handed to them with the assurance that it would guarantee good results. This was true so far as physical properties were concerned, but did not take into consideration economy.

The specifications for portland cement concrete, referred to, were developed in the East, where traprock is used for coarse aggregate, and was very satisfactory for a crushed rock product, yet when applied to sand and gravel great waste of valuable material was made necessary.

## **Saving by 15 Per Cent Tolerance**

The story of the tests made by our association in 1919 and 1920 and our success in securing a 15 per cent tolerance has been described in the Bulletin of the National Association of Sand and Gravel Producers. The granting of this 15 per cent tolerance saves millions of tons of intermediate size aggregate that heretofore were wasted. One plant alone in Indiana has a million tons of 1/4-in. material in the waste pile. This is of the same quality as the larger aggregate and when properly used makes an excellent concrete.

The Testing Department in Illinois has been making extensive experiments, as explained by Mr. Clemmer (see *Rock Products*, April 8, 1922) on the quality of con-

crete made from different aggregates. The department is learning that good concrete can be made from a wide range of sizes, as we learned in Indiana.

The second problem in the measuring and grading of aggregates that has been brought to our attention in Indiana is the conflict between the arbitrary proportioning of cement, sand, and gravel and the arbitrary fixing of the amount of cement per cubic yard of finished concrete in place. For instance: a 1:2:4 concrete requires, according to standard tables, 1 1/2 bbl. of cement per cu. yd. of concrete, with 0.45 cu. yd. of loose sand and 0.89 cu. yd. of loose gravel. When these are mixed, wetted, and rammed into place they should constitute a cu. yd. of concrete. For certain gradings of sand and gravel an exact cubic yard is obtained, but with other allowable gradings it is possible to get from 10 to 15 per cent more concrete out of these proportions. The laws controlling the proportioning of these materials are quite complex and are not easily understood, and because of this, cut-and-try methods must be used constantly. The correction for the above conflict is obtained by making one specification arbitrary and the other one approximate. In Indiana the amount of cement per cubic yard is made constant; in Illinois the proportions are made constant. Personally, I favor the Indiana method; however, either may be used safely.

## **Importance of Grading**

The third problem encountered is in the measuring of aggregates. My attention has been called to a statute in Illinois specifying the weights per cu. yd. for certain concrete aggregates. The inconsistency of such a statute is evident upon a little study of the character and the method of handling these materials. The factors affecting the weight of an aggregate are specific gravity, grading, shape of particle and moisture. The specific gravity is the ratio of the weight of the solid parts of the

material to the weight of an equal volume of water. A material with a specific gravity of 2.7 would weigh more, while one with a specific gravity of 2.5 would weigh less than a material of specific gravity 2.6.

The grading of an aggregate involves the proportioning of the various sizes of particles. Grading is measured by screen analysis, which separates the material into various sizes and determines the amount of each size.

The shape of the particles is either angular or spherical. Gravels are spherical; crushed rocks are angular.

The percentage of moisture affects the weight per cubic foot in two different ways. Due to the physical property called surface tension, the finer particles of aggregates are held apart when moistened, thus increasing the voids and decreasing the weight per cubic foot. Aggregates may also absorb a certain small percentage of moisture, which will affect the weight per cubic foot to the amount of absorption. (Probably not over 15 per cent.)

Each of these factors affects the weight per cubic foot through an indefinite range. The specific gravity varies for materials in the Central States from 2.45 to 2.70, a range of 10 per cent. It is possible to have an aggregate whose specific gravity is all 2.45 or all 2.70 or a conglomerate of specific gravities between these two.

## **Measuring the Aggregates**

The grading of materials perhaps affects the weight the most, is the least understood, and is indeterminate except for one or two simple gradings. For instance: If the particles are all of the same size, say 1 in. in diameter, and are round, like gravel, these particles when thrown into a box loosely would leave about 45 per cent voids and a cubic yard would weigh 2500 lb. The same would be true if the particles were all 3/4 in. in size, or 1/10 in. in size, or, in fact, any diameter, because the law holds true for all sizes. If the par-

ticles vary in size so that some are 1-in., some  $\frac{1}{2}$ -in., some  $\frac{1}{4}$ -in., and some  $\frac{1}{10}$ -in., the percentage of voids would be considerably lessened. A certain proportion of each of the above sizes would go as low as 30 per cent voids, which would make the weight per cubic yard a little over 3000 lb. It is possible to grade the materials so that the voids may be as low as 20 per cent in practice, making the weight per cubic yard as much as 3400 or 3500 lb. This would necessitate grading, however, from the coarsest to the finest, which would be a plant mix.

The shape or form of the particles affects the weight per cubic foot or cubic yard probably not over 7 per cent. An angular aggregate might be estimated to have from 5 to 7 per cent more voids than a rounded aggregate.

The percentage of moisture would affect the weight per cubic yard throughout a range of 30 per cent for fine aggregates, and for coarse aggregates the effect is negligible for practical purposes. To illustrate the effect of the per cent of moisture on sand, the following is copied from a standard treatise on portland cement concrete:

"The actual variation on different days in the percentage of moisture in a natural bank sand was found by the authors, in a

series of experiments, to range from  $1\frac{1}{2}$  to  $5\frac{1}{4}$  per cent of that total weight, or from  $2\frac{1}{2}$  to  $7\frac{1}{4}$  per cent of the bulk of the moist sand. The sand, screened from a gravel bank in eastern Massachusetts, ranged in coarseness from very fine to that which would pass a  $\frac{3}{4}$ -in. mesh screen. The moist sample was taken from the pile the day after a shower, and weighed  $84\frac{1}{2}$  lb. per cu. ft., while the drier sample, taken after a period of dry weather, weighed 107 lb. per cu. ft. A sample of very fine sand which had been standing in a pile through the same shower contained  $9\frac{1}{2}$  per cent of moisture by weight, corresponding to 13 per cent by volume. Ordinary gravel, on the other hand, from which the sand had been screened, was found after a heavy rain to contain only 1.8 per cent of moisture by weight, this being apparently the maximum quantity which it would hold."

In view of the above variations in the weight of fine aggregates in pounds per cubic yard, it seems that the Illinois statute governing this is not based on fact.

I have the design and preliminary tests completed for a wet process screening outfit for plant testing, so that the sand and gravel producer may make a screen analysis of a product just previous to shipment and, if he cares to, send a copy with the bill of lading.

## Mid-West Cement Boycott Off

ROAD building in the Middle West on a larger scale than ever before is assured. State contracts for cement which have been pending for a month or more have now been let and contracts for the individual mileages are being opened rapidly. The boycott, so called, of Wisconsin, Illinois, Indiana and Michigan against cement has been dropped, and that without material price concessions.

Michigan has signed up for 1,120,000 bbl., which will build about 340 miles. Illinois on April 6 announced the placing of 2,700,000 bbl., bringing the total purchase to 3,600,000 bbl., enough for its 1,000-mile program. On March 31 Illinois received bids on 95 miles of road. Indiana on April 6 added 110,000 bbl. to the 212,000 bbl. purchased in March and has yet to apportion an additional 200,000 bbl. to the various cement companies, enough to build about 150 miles. Wisconsin last month bought 1,500,000 bbl. for its 450-mile quota, of which more than 220 miles have been let to the individual contractors.

As these states, which are the principal ones that buy cement and furnish it to the contractors, each have as large or larger programs than ever before, the road building stage in the Middle West is set for an unprecedented program.

The effect of the boycott on prices has been insignificant, but we may hear from

it later. The price concessions which were announced as the object of the boycott have not been secured. Where there have been sizeable concessions, they have been offset by the condition that the cement must be taken in large quantities early in the season and warehoused at the State's expense.

But there may be another result, shortage of cement in the late summer or fall, or a number of mills shut down part of their capacity on account of the boycott. We may, therefore, hear echoes of the boycott some months from now.

Just now the interesting fact is that the boycott has been lifted and that four of the states with large road programs are not to hold up their work any longer.—*Engineering News-Record.*

### Rate Reductions on Sand and Gravel

A REDUCTION of 1 cent per hundred pounds coming to Fargo, N. D., from Detroit and Minnesota points, effective April 27, has been announced. Local contractors declare that this will give impetus to the home building campaign now under way. It means a saving of \$13.50 per car.

Substantial reductions were also made by the I. C. C. after the good work by

the quarry and materials men in Iowa. The reductions approximate a 3, 7 and 12 per cent cut on one ton for 3, 50 and 100-mile hauls, on two or more lines. On the one line hauls for the same distances the reductions are 4, 10 and 13 per cent. The usual minimum of 90 per cent. of the marked capacity of a car and not less than 40,000 lb. rule applies. This will mean a considerable saving to Sioux City contractors and material men, according to reports. The fight for the reduction has been carried on for some time.

### Ohio Paving Costs Drop 20 Per Cent

OHIO'S highway department has informed its county surveyors that construction is about 20 per cent lower this year than last. The average cost per mile of all types of roads for which contracts were let during the first three months of 1922 was \$27,500 as compared with an average of \$34,000 during the 12 months of 1921. Except in a few instances, it was also shown that reductions are noted in the department's calculations for each type of road.

### Limestone Rates Lowered 13 Per Cent

A REDUCTION of 13 per cent has been ordered by the Iowa Railroad Commission on the freight rate of limestone used for agricultural purposes. This will, according to H. W. Warner of the Iowa State College, help in increasing the supply and permit a lower price on the material.

### Wisconsin Aggregate's New Address

THE new address of the Wisconsin Mineral Aggregate Association is: Rooms 1018-1020 Railway Exchange building, 97 Wisconsin street, Milwaukee, Wis., announces Executive Secretary O. C. Hubbard. There will be no change in its telephone number.

### British Chemical Lime

AN interesting and instructive pamphlet, *Chemical Lime*, published by the Calow Rock Lime Co., Ltd., 810 Salisbury House, London, England, has been received by Rock Products.

While this pamphlet deals at some length with the properties of this company's own product and other British limes, at the same time it furnishes a good deal of general information on the subject of lime. The company will gladly send this pamphlet to anyone in America who is interested.

# The Removal of Clay from Sand and Rock

By EDMUND SHAW, El Paso, Texas

The importance of using the proper apparatus in removing forms of clay that are not free, is brought out by Mr. Shaw in this seventh installment. How film clay and the tough, compact lumps are removed

SO far in these articles we have considered only the removal of the free clay, which is the greater part of the clay encountered in washing. As we have made apparent, no special apparatus is needed in its removal, for while well-designed sand separators do better work, and do it with less cost and attention, it is still possible to wash out the free clay by so simple an apparatus as an ordinary settling bin or tank.

The apparatus to be employed, however, is an important matter in removing those forms of clay which are not free, and which in those cases where they occur give more trouble to the plant operator than the free clay ever could. These forms are the film clay, which adheres to the outside of the grains, and the tough, compact lumps of clay, which come from clay layers or strata in the deposit and are known as "clay balls."

## Film Clay

Of the two, the film clay offers much less resistance to removal, for it may be scrubbed off, provided sufficient friction is given to the surface of the grain. What is more important, as soon as it is released from the surface of the grain it becomes free clay, and is washed out of the sand as easily as the rest of the free clay. But the clay ball is not so accommodating. Rolling it around in a screen or scrubber seems to compact it and make it harder and more obstinate. Attempts to crush it under light pressure merely cause it to change its shape. If a large clay ball is broken in pieces, the pieces form smaller clay balls which display all the obstinate traits of the parent. Exposure to the air will disintegrate them, but this often works to the discomfiture of the plant operator, who sees what appeared to be a pile of nice, clean gravel become a mass of mud-smeared stones from the weathering of the clay balls which it contained and their subsequent dissolution in the first shower that came along.

Numerous methods have been adopted

for getting rid of clay balls, but all of them are divided into two classes. The first may be called a sorting method, since no attempt is made to destroy the clay ball, but only to remove it. The second is called the disintegration method, as the attempt is made to destroy the clay ball and turn it into free clay so far as possible.

Although these methods are spoken of as distinct from one another, it must not be understood that one is used to the exclusion of the other, for in most plants they are found in combination. Sorting may precede disintegration to reduce the clay to be handled by picking the largest and most refractory lumps of clay. Or it may follow the action of the disintegrator and pick out the clay balls which have escaped destruction.

## Hand Sorting

Hand sorting is the method much employed in washing phosphate rock. The lump rock (which is a gravel of from about 2 in. down to  $\frac{1}{4}$  in. diameter), after being washed through the plant, is sent to a picking belt. Pickers stand on both sides of the belt and pick off the clay balls along with the lumps of flint and limestone, and any other substances that would lower the grade of the washed product. In the Florida "hard-rock" fields a revolving table is used instead of a belt, and colored women are often employed as pickers.

This method is fairly efficient in removing the largest lumps, and, while it is somewhat expensive, its cost is justified in those cases in which the washed material has to be picked anyway in order to remove the lumps of flint and limestone. Even in handling large tonnages it may pay to do some hand sorting. There was mentioned such a case in one of the first articles of this series, where in a 2000-ton gravel plant there were eight men picking the lumps of clay from the field conveyor that brought the crude material to the plant and thus prevented the formation of clay balls.

The cost was shown to be less than 2 cents per ton, while the benefit to the product was many times that amount.

Hand-sorting methods, however, are growing out of favor in all the industries. This is especially true where large tonnage is handled. For this reason, many attempts have been made to substitute mechanical sorting for hand sorting, one of the most successful being sorting by screening.

Such a method is found in almost universal use in the Florida "pebble" phosphate fields. In almost all cases the material is mined by hydraulic methods, which have a powerful disintegrating effect in themselves, but which are still insufficient to break up the hard lumps. On the way to the washer these lumps are pressed and rolled into globular form. The greater part of these lumps are more than 2 in. in diameter, therefore the stream is first passed through a  $1\frac{3}{4}$ -in. revolving screen, which removes the clay balls along with the roots, trash, fossil bones and other unwanted substances.

In this case, it will be noted, the clay balls are removed as an oversize. But the writer saw an application of the screening method in a phosphate plant in another field which was interesting because it removed the clay balls as an intermediate size. Owing to a partial disintegration given by the first part of the washing process in this particular plant, the clay balls were largely less than 1 in. in diameter and more than  $\frac{1}{2}$  in. So, by making a product between a 1-in. and a  $\frac{1}{2}$ -in. screen, the greater part of the clay balls were removed. As there was a considerable loss of good phosphate rock of the same size, eventually this method was discarded for a better one. But it served its purpose as a temporary measure, and it deserves notice on account of its ingenuity.

In all of these methods there is a considerable loss, as the clay balls pick up and hold valuable material as they pass through the plant. This is not a serious matter in washing such material as con-

crete sand, but it is serious when we are dealing with phosphate rock and the even more valuable materials which are cleansed by washing. For example, the placer miners of the West, who wash sand and gravel for their gold contents, have a particular hatred for clay balls, which they call "gold thieves." The sticky surface of the clay ball seems to have a peculiar attraction for the grains and flakes of fine gold, and once they are imbedded in its surface they are pressed

this reason the methods which disintegrate and destroy the clay ball are to be preferred if they can be applied without too much expense.

The use of the toothed roll has already been mentioned. This roll is a coarse machine and can therefore do little more than tear up the larger lumps of clay and start the disintegration. To finish the work we must rely on other machines.

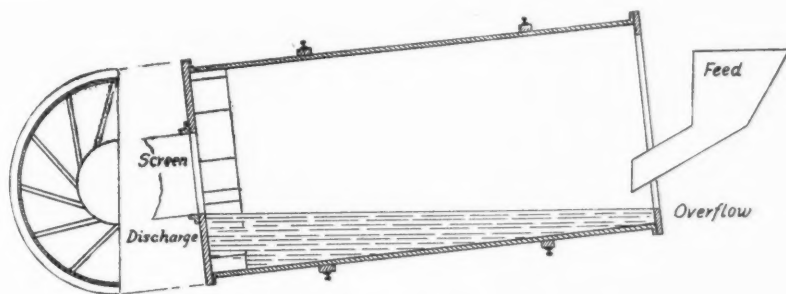
Again, in these machines we find that there is a division into two widely differ-

and disintegrators is the log washer. This machine takes its curious name from the original form—a home-made affair and said to be still in use in some of the out-of-the-way places. The "log" from which the name came was a tree-trunk about 15 or 20 ft. long. It was hewn "eight square" and about a foot in diameter. A number of wrought-iron blades were driven into the log so that they formed a spiral path or screw thread around the log. Iron gudgeons were driven into the end for the log to turn on. The log was mounted in a trough, the gudgeons going into rough bearings of wood that held the log so that the blades just cleared the bottom as it turned. This trough was inclined about 10 deg. from the horizontal. When a drive pulley was put on the higher end the machine was ready for use.

The material is fed into the lower end of the log washer, and the coarse material sinks directly to the bottom while the water and clay overflow. The blades on the log move the coarse material along the bottom and also cut and tear any lumps of clay that may be present. Sometimes sprays are placed along the course of the travel to wash back any clay that is liberated in this way. The coarse material is discharged practically dry at the high end of the trough.

#### Getting Right Results

While no great amount of skill is necessary to run such a machine, it is noticed that some operators get better results than others. One especially successful operator, who produces a product that is especially free from clay balls, informed the writer that the whole secret of his success is in running a sufficiently small amount of water with the material that the water is thick with clay—"soupy," as he expressed it. The angle at which the trough is set is important and also the speed at which the log turns.



The washing can, also known as a "scrubber"

in all the more tightly as the ball rolls through the sluice—and they are sure to go out with the tailings.

Rolls are employed at the head of many plants with the idea of crushing clay balls as well as oversize pieces of rock. It is quite the usual custom to use them in this way in the Tennessee phosphate fields. Generally they have toothed, or corrugated surfaces for the rolls to tear as well as crush the clay balls. The consideration of such machines will be included with that of the disintegrators, which will be taken up later.

#### Other Methods of Sorting

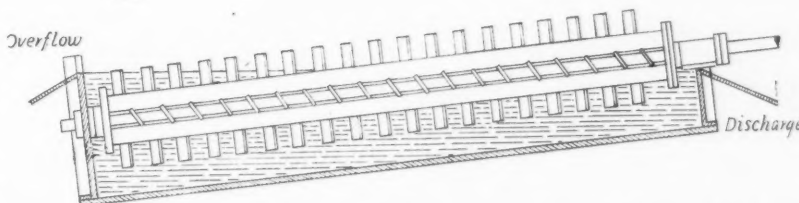
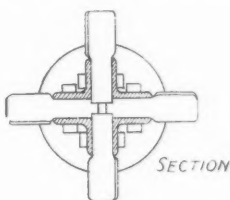
Before leaving the subject of mechanical sorting to remove clay balls, it may be well to mention some methods which do not appear to have passed the experimental stage, but which still hold out some promise of success. One of these is jiggling. The writer once saw the attempt made to use a rough hand jig to take out clay balls, and while the attempt was not a success, he believes that a better form of apparatus would have resulted in some success. Small clay balls have been removed from phosphate sands by the use of a concentrating table.

Another method which showed some promise was based on the difference of travel of the round clay balls and the flatter pieces of gravel. It is possible that experiments made along this line would develop a practical commercial machine.

A sorting method of any kind is still open to the objection noted—that of the losses that occur in the material picked up and removed by the clay ball. For

ent classes. The first of these are the machines which employ mechanical means, and a crushing and tearing action, like the toothed roll just mentioned. The second is that class which relies on the disintegrating effect of jets of water.

Here must be considered the removal of film clay, for practically all the disintegrating machines are also scrubbers. For the disintegrating action there is used the contact between the crude material and the blades or other active parts



The log washer is the best known combined scrubber and disintegrator

of the machine. For the scrubbing action, the rubbing of the grains on one another as they pass through the machine is sufficient to do the work. As the two operations are performed simultaneously their consideration will not be kept apart.

#### The Log Washer

Probably the best known and most widely used of these combined scrubbers

On the whole, the log washer seems to be a fairly satisfactory machine for the work to which it is put, and it is notable in that it has hardly changed from the original form described. The only improvements that have been made are in construction, for iron has replaced wood and crude forms have been replaced by better designs.

There is a similar machine, both in

form and operation, which is used largely in washing silica sand. The blades of the log in this machine are replaced by flights that make a complete screw-thread. In fact, the machine is a heavy-duty screw conveyor running in a trough, and while this machine is not much of a disintegrator, it is an excellent scrubber and dewaterer.

### **The Washing Can**

The machine which is perhaps next in popularity to the log washer is that known as a "scrubber," or "washing can," and which in the older books is called a "wash trommel," the form and operation in all cases being about the same. In washing concrete sand and the like it is usually called a scrubber—merely a revolving screen frame covered with sheet metal instead of screen fabric. Usually there is a circular dam placed at the lower end to keep the material from discharging too quickly. This dam maintains a thick bed on the sheet metal, much thicker than would be maintained if any screening were to be done. Sprays of water are sometimes added, and sometimes angle-iron "lifters" are placed on the inside surface to lift and turn the material as it travels down the slope.

The more elaborate form, so generally used in the Tennessee phosphate fields, locally is called a washing can. An average specimen is 15 ft. long and 7 ft. in diameter, made of heavy plate metal. A short distance from either end is a tire which runs on rollers. The can is inclined, the feed end being about 2 ft. lower than the discharge end, so that other rollers have to be provided to take up the thrust, or the tendency to slide down hill, which all moving parts show when they are revolved on an axis that is not horizontal. There is a circular dam at the lower or feed end and a series of lifting scoops which discharge the washed product through a hole in the higher end.

The feed is admitted through a spout that passes over and beyond the circular dam. The coarse material sinks to the bottom and the water runs back and out over the dam, carrying with it the clay and fine sand. There are angle-iron lifters on the inside surface that lift and turn the coarse material and work it toward the high end, where it is finally discharged by the scoops. The action is not unlike that of the tube mill employed in the cement and other industries. The coarser lumps of rock furnish the grinding medium and mash down and break up the clay balls and scour the surface of the grains very thoroughly.

Opinion is divided as to which is the better machine for local conditions, the can or the log washer, but as the results seem about equally good from the different plants, the choice would seem to be

a matter of personal taste. The log washer is said to have the disadvantage of a somewhat higher repair cost.

An interesting washing can in one of the Tennessee plants is run in a box of water, so that the material is submerged the greater part of the time. There is a lively current of water through this box and an overflow at one end. Another unusual feature about this machine is that it is hung in loops of wire cable instead of being supported on tires.

In order to do away with driving a machine which is not revolved on a horizontal axis, a form has been designed which is conical instead of cylindrical. The sloping sides give the same effect as inclining the whole machine, and the difficulties of driving are obviated. To the writer, however, these difficulties are more imaginary than real, as he has noticed that the rollers which are supposed to take up the thrust have practically nothing to do when the tire and supporting wheels are in good condition.

### **Washer and Can Combination**

A curious combination of log washer and washing can is found in some of the older books describing the washing of iron ore. This machine has a revolving cylinder, inside of which is a stationary shaft with a set of blades like the blades of a log washer. The action is much the same as the action of the log washer except that the material is moved past the blades instead of the blades moving the material. It would seem to offer no advantages over the usual form.

There are several other forms of disintegrators in use, some of which are worth brief mention. One of these is the machine which has been called the "squirrel cage." It consists of two cylinders of bars, like a squirrel cage, one inside the other and revolving in opposite directions. It does a fairly good job of breaking up lumps, but rocks must be kept out of it. Another odd machine throws off the material from a fast revolving disk, so that the lumps strike on the inside of a cylinder. Then there are the washing pans, which have been used for washing emery and carborundum and which have also been used for washing the blue ground of South Africa, from which diamonds are obtained.

One of the most interesting of these unusual disintegrating machines is to be found in one of the Tennessee phosphate plants, which was designed by an engineer who had been employed in the placer gold mining fields of the Ural mountains in Russia. It is the standard machine in those fields for disintegrating clayey ground, and he liked its work so well that he adapted it to phosphate-rock washing. It consists of a concrete tank 30 ft. in diameter and 10 ft. deep. In the center is a concrete column, on the top

of which is a vertical bearing. A short shaft revolving in this carries four arms that reach almost to the outside of the tank. Chains hang from these arms and from the ends of these chains are hung drags, or harrows, the teeth of which are made of inch-square steel. The arms revolve at a good rate and the rakes tear through the bed of material on the bottom and do a thorough job of disintegrating and scrubbing. Water runs into the tank and out through a screen at one side, and the current of water plus the action of the rakes discharge the material through the screen.

Although the machine has not been copied in the field, it bears an excellent reputation among the operators for doing good work, and it is difficult to find even a small clay ball in the washed product.

### **Disintegrators Using Jets**

No. 8 in this series will discuss disintegrators using jets.

(To be continued)

## **Liquid Oxygen Explosives Promise Good Results**

ALTHOUGH the use of liquid oxygen explosives has not yet made much headway in the United States, experiments made by a company at Pachuca, Mexico, operated by American capital, promise quite satisfactory results, according to observations made by the Bureau of Mines. From the beginning of the entrance of the United States into the World War efforts have been made by George S. Rice, chief mining engineer, to have liquid oxygen explosives tried out practically in this country, but as no manufacturer in this country makes oxygen liquefying plants, the use of these explosives here has been limited. The development so far has been largely German, and in Germany oxygen liquefying plants are manufactured in various sizes in complete units of apparatus and containers.

Since the war the only extensive development outside of Germany has been in the Lorraine iron mines, where the Germans installed apparatus, and additional apparatus has been put in by the French. One Lorraine company is mining its entire annual output of 1,500,000 tons of iron ore by the use of these explosives, having developed a cartridge of its own on which it has received patents and applied for others. It is claimed to be an improvement on the German cartridge. The Germans use soot for breaking effects, and for slow heaving effects, wood pulp. Either fuse or electric detonators can be used for igniting the charge. The Germans have now developed a method of placing the electric detonator in the bottom of the hole in a special container and have been able to fire large rounds, it is claimed, as high as 28 shots at a time.

# Accident Prevention

## Quarry Accidents in the United States

By W. W. ADAMS, U. S. Bureau of Mines

THIS is the concluding installment of the United States Bureau of Mines report built on data relating to accidents in quarries.

**Marble Quarries.**—The marble quarrying industry employed 4,438 men in 1920, an increase of 432, or about 11 per cent, over the number employed in 1919. A total of 1,304,552 shifts worked by all employees and an average of 294 shifts per man indicate an increase of 128,676 shifts over the record for 1919, but no change in the average number of working days per employee.

Accidents at marble quarries resulted in 4 workers being killed and 400 injured, a fatality rate of 0.92 and an injury rate of 91.98 for every 300,000 shifts. All four of the fatalities occurred at the outside rock-dressing plants, two in Vermont, and one each in Georgia and Massachusetts, and none inside the quarry pits.

The increase of 105 in the number of nonfatal injuries at marble quarries in 1920 was largely from handling rock by hand, flying objects, drilling and channeling, nails and splinters, and machinery.

**Slate Quarries.**—Reports from quarries producing slate in 1920 shows 75 operating companies at whose quarries 3496 men were employed. A total of 1,009,244 shifts was worked by all employees, an average of 289 shifts per man. Seventy-six per cent of the total shifts were worked inside the quarries and 24 per cent outside the quarries. The two leading slate-producing States, Pennsylvania and Vermont, showed a notable increase in total shifts, as compared with the previous year.

Accidents caused 5 deaths and 364 injuries, a fatality rate of 1.49 and an injury rate of 108.20, as compared with rates of 1.78 killed and 98.51 injured for 1919. Of the total number of workers during the year at all kinds of quarries covered by this report, 4 per cent were employed at quarries producing slate.

**Trap-Rock Quarries.**—Reports from 99 operators of trap-rock quarries active in 1920 show that this branch of the quarrying industry employed 4,951 men, who worked a total of 1,147,480 shifts, an average of 232 shifts per man. Sixty-eight per cent of the total shifts were worked by employees inside the quarries and 32 per cent were worked by employees at the outside works. Except for Massachusetts and Oregon, all states

showed a larger number of shifts in 1920 than in 1919.

Accidents during the year killed 10 men and injured 799. The resulting accident

cause; the rate was 0.79 per thousand men employed. The nonfatal injury rate was only 4.69 and ranked ninth among the listed causes of injuries to employees inside the quarries.

As different classes of stone—for example, building stone and crushed stone—are produced at quarries, the methods of quarrying must vary, especially as regards blasting, handling, and transporting the quarry product. In handling building stone much care has to be taken to insure minimum breakage. Furthermore, in the production of building stone the least possible amount of explosives must be used to prevent shattering. At quarries producing crushed stone, on the other hand, the excessive use of explosives is advantageous. Stone to be used as a crushed product will require no care to prevent breakage; in fact, the more breakage the better; for this reason also the accident hazard is undoubtedly greater. Explosives are also used to break exceedingly large pieces, so that they will go through the crusher without further reduction by sledging. Consequently there is a wide difference in the amount of explosives used.

The principal cause of injuries at quarries producing building stone was flying objects, followed by handling rock at the face, machinery, and falls of persons.

At quarries producing crushed stone the major causes of nonfatal accidents were handling, handling rock at the face, flying objects, falling objects, and machinery in the order named. At the outside works of crushed-stone quarries the principal causes of injuries were machinery, falling and flying objects, and falls of persons.

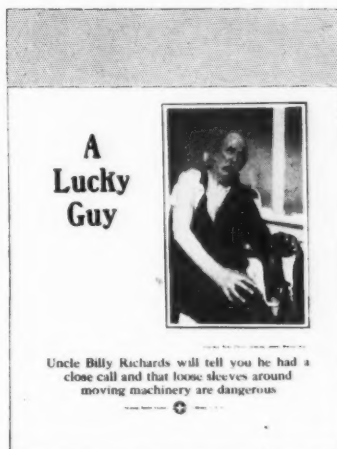
## Protect the Drinking-Water

THE hand pump outside the shop door, the water pail, left to collect dirt and dust, the water-boy—all are institutions rapidly becoming extinct, says George Earl Wallis in *National Safety News* for May. Pure drinking water is essential to every industrial establishment because of the close relation between health and drinking water.

Watch the source from which you get the water. Have it tested for its bacteriological content. Look out for lime, sulphur, iron or other elements that are unsuitable for drinking purposes without first being purified.

The tilted jet type of drinking fountain is best suited to guard against infection and disease.

## 36 New Safety Bulletins Each Month



Will Make Your Shop Bulletin Board As Interesting As a Newspaper

OUR SAFETY BULLETINS attract the workers' attention, and hold their interest. No highbrow stuff—they don't shoot over the heads of the workmen! Simple, yet full of human interest, they put the safety message across in a way that sticks! Results? They have helped many of the Council's members to reduce accidents 75 per cent or more because they instruct, they stimulate safety thinking, and they develop the safety habit among the men.

Members of the National Safety Council receive 36 different safety posters each month—extra copies as desired. A new bulletin every day! All posters attractively printed in two colors. Sizes 9x12 and 17x23 in.

SAFETY BULLETINS comprise only one item of the service you will secure through membership in the National Safety Council—a non-profit, co-operative association of 3500 employers helping each other to reduce the cost of accidents to their workers.

Write for sample safety bulletins today—post them on your bulletin boards and watch the results.

## National Safety Council

Dept. R-1

Co-operative Not-for-Profit  
168 North Michigan Avenue, Chicago, Ill.

rates were 2.61 killed and 208.89 injured per thousand employees, as compared with rates of 2.56 killed and 186.47 injured in 1919. Of the total number of workers at all kinds of quarries last year, trap-rock quarries employed 5.7 per cent.

More fatalities resulted from the use of explosives in 1920 than from any other

# Steel Barrels Made at Home

For shipping lime with little fear of spoilage, metal containers have many advantages. This article tells how the American Lime and Stone Co. is making its own steel barrels for marketing its product

STEEL drums for shipping lime have advantages which are not present with other lime containers. Deterioration is slow; experiments have shown that lime in steel containers remains in good condition for six months under trying atmospheric conditions. Steel barrels are compact and easy to handle. In storage or on the job a waterproof covering is not necessary as it is with wooden or paper containers.

Because of these advantages the American Lime and Stone Co. recently installed at its plant at Bellefonte, Pa., a shop for making its own steel barrels.

This shop, shown in the illustration, is about 30x60 ft., and contains all the machinery necessary for turning out steel drums from sheet steel stock. Working at full capacity this plant makes 600 bbl. in a nine-hour day with seven men. The barrel-making machinery is furnished by the D. H. Stoll Co., Inc., of Buffalo, N. Y., and produces an atmospheric-proof steel package without riveting, soldering, or welding. Sheet steel 27 gage is used in making the barrel, the finished dimensions of which are 18 in. in diameter and 26 in. high, with a 15¼ in. opening in the top. This makes a container of 185 lb. capacity, which meets the Interstate Commerce Commission requirements for lime shipments.

In making the barrels the body sheet is

accurately sheared to size, the corners specially notched with step notches, and the box formations pressed. When the side seam has been closed it appears in

Bottoms, tops, and covers are pressed from sheet stock, and at the same time the company's name, address, and trademark can be stamped in the bottoms and



*A good, roomy layout—600 steel drums a day can be made here*

cross-section as the drawing shows it.

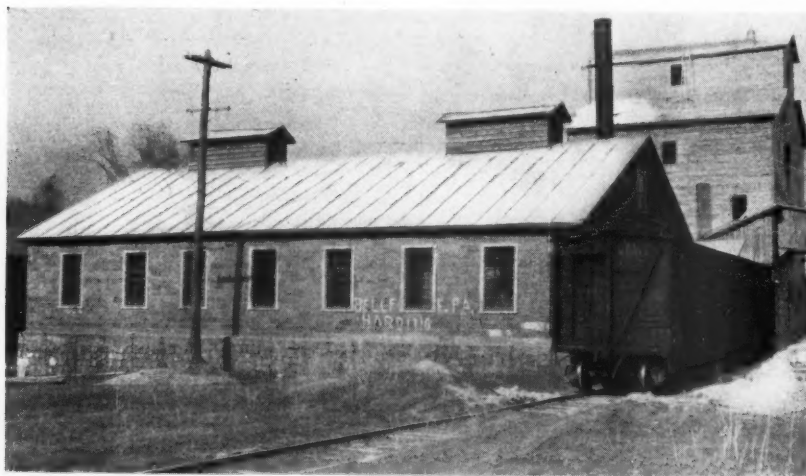
The body is corrugated in the next operation in order to provide increased strength and improved appearance, and then the putting of flanges on the two ends completes the cylindrical body of the barrel.

covers. There is no little advertising value in neat, stout containers of this sort well marked as are the cover and bottom shown.

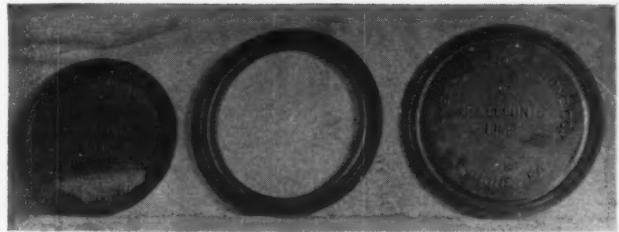
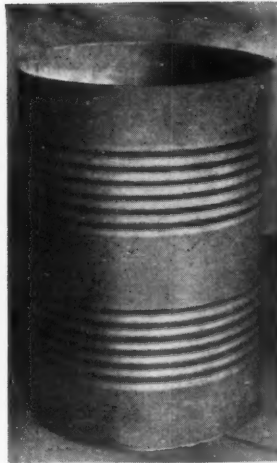
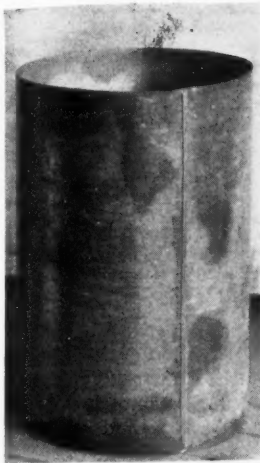
After assembling of top and bottom with the cylinder, the barrel is ready for filling, after which the cover is inserted and sealed with a hand beading device. Cross-sections of the top and bottom assembly joints and of the cover beading are shown.

The illustration of the barrel plant interior shows the assembly operation—pressing the tops and bottoms on the cylinders. At the right of the same illustration is one of the presses used for making barrel ends, and at the left are the shears where the first operation in making the cylinder is performed.

The machinery for a plant of this sort represents an investment of about \$15,000. This does not include the cost of installation, nor the power equipment. Individual motor drive is used at the American Lime and Stone Co.'s plant, and that is probably the best form of power to use, especially where the plant is not to be run at full capacity at all times. About 40 h.p. is needed for a plant of this kind.

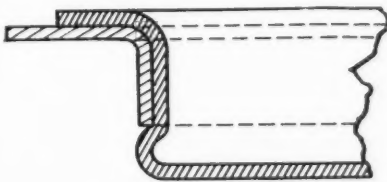
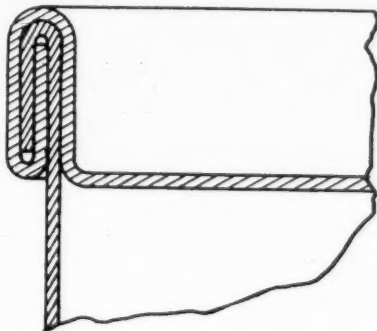
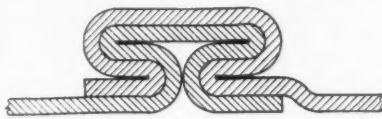


*Where steel barrels are made at the American Lime and Stone Co.*



#### FIVE STEPS OF BARREL MAKING

At the left of the page is the cylinder with the side seam, the first step in making the barrel after the sheet has been sheared to size. Next is the barrel after it has been corrugated to add to its strength and appearance, and the flange at each end added. Above, at the left, is the cap which fits into the top, shown in the center, and at the right is the bottom. The neatly stamped top and bottom are good publicity for the producer



Three cross-section details—the side seam, the top and bottom seam, and the cap beading

An estimated cost of material and labor is given below:

Material	Weight, Lb.
Bodies—No. 27 Gage sheet, 27x59"	\$ 7.61
Two heads—No. 27 Gage sheets, 20½"x41"	4.01
Cover—No. 27 Gage sheets, 18½"x18½"	1.72

Cost of steel, at 3c.....\$13.34  
Labor, at 35 cents per hour.....\$0.4002

Body, Shearing.....	.004
Notching.....	.004
Forming side seam.....	.004
Rolling.....	.004
Closing side seam.....	.004
Flanging.....	.0075
Corrugating.....	.0075
Double seaming.....	.01

Total labor on body.....\$ .045  
Tops and bottoms.....  
One operation top.....\$ .002  
One operation bottom......002

One hole and edge.....	.002
One cover.....	.002
Total labor tops and bottoms.....	\$ .008
100% Overhead on Labor.....	\$ .053
Cost per drum.....	\$ .106
	\$ .5062

While the cost of steel containers is likely to run higher than the cost of other containers, their advantages probably more than offset this difference in cost.

#### Analysis of Detonating and Priming Mixtures

THE above caption is the title of Technical Paper No. 282, written by C. A. Taylor and W. H. Rinkenbach of the Bureau of Mines. A real need exists for the adaptation of the methods followed in the analysis of stable materials to the sensitive compounds and mixtures used in explosives in order that the analyst will know how to proceed with maximum safety and confidence.

This paper is intended to satisfy part of this need and is a continuation of the publications on explosives analysis from the Pittsburgh laboratory of the Bureau of Mines. The methods given are those used in practical work and are not intended to cover the needs of a research chemist working on a particular compound.

#### Earl Harsh Now with Spengler, Inc.

EARL C. HARSH is now associated with Warren D. Spengler, Inc., engineers and constructors, in the Hanna building, Cleveland, O., where he will continue to specialize in the design and construction of lime and stone plants and work of a similar nature.

Mr. Harsh has had a broad experience over a period of 15 years in the design, construction and operation of stone-crush-

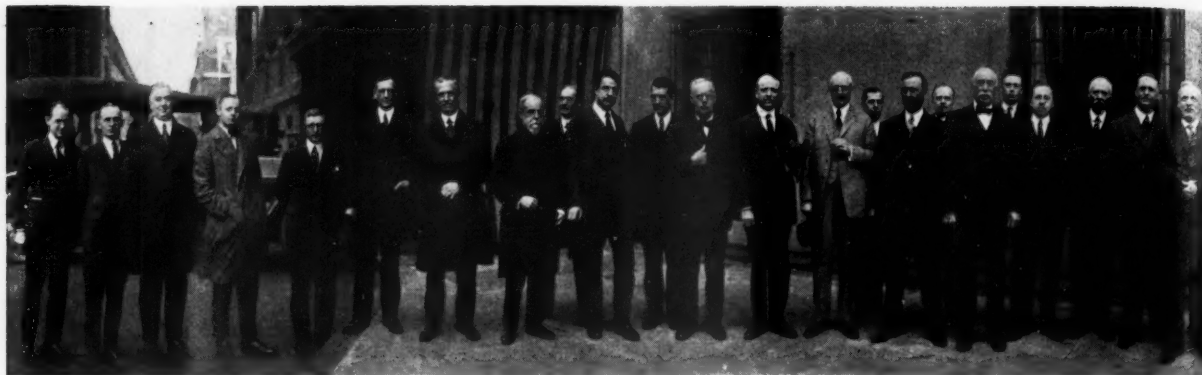
ing, lime-burning and hydrating plants, having been at one time engineer with the Kelley Island Lime and Transport Co. and with the Allis-Chalmers Mfg. Co., and later in private practice as a consulting



Earl C. Harsh

engineer. During the War he served as a captain of engineers in France.

The Spengler organization includes men of experience in industrial plant design, construction and operation, transmission and distribution systems, the application of power to industrial plant work, etc. Recently they have been giving considerable attention to the reduction of power and other operating costs through corrective work. The combined experience places the organization in an excellent position to serve the lime and stone industry on operating and power problems as well as on any new plant design or construction.



Here they are—23 of the men who attended the recent slate producers' conference: W. S. Hays, Harry Stoddard, John W. Powers, J. H. Emack, Mr. Saeger, A. H. Morrow, unknown, Rudolph P. Miller, W. H. Kemall, D. Knickerbacker Boyd, Sullivan W. Jones, James Owens, P. N. Snyder, F. C. Sheldon, LeRoy E. Kern, John A. Williams, N. C. Rockwood, Mr. Jackson, J. E. O'Brien, P. O'Brien, William Blake, M. L. Parsons, and Robert O. Owens

## A Slate Association

New life for this industry is indicated in the organization of slate producers recently formed at New York

**S**LATE production curves, which have shown a tendency in recent years to slant downward, are likely to take a sudden turn upward if the enthusiasm of the recent slate producers' meeting does not ebb. The meeting was the second one this year held for the purpose of forming an association, and at this meeting an association was formed, backed by the pledges of practically all the important slate producers of the country.

The first meeting was held in New York on February 9, and has been previously reported. The second meeting was in New York on April 20, and the same men—Oliver Bowles, of the U. S. Bureau of Mines, and W. S. Hays, of the National Federation of Construction Industries—acted as chairman and secretary, respectively, at both meetings.

The important thing about the morning session of this last meeting was the report of the freight rates committee, presented by William H. Smith, of Bangor, Pa. The case had been ably presented before the Interstate Commerce Commission, and the brief of the committee shows that real discrimination exists against slate. The decision of the commission is due at any time now, and because the railroads could not contest the facts presented it is practically certain that reductions will be granted. This will help to relieve one of the burdens which have kept slate sales low.

Sullivan Jones, chairman of the structural service committee of the American Institute of Architects, and W. A. Durgin, of the Department of Commerce, were among the morning speakers.

At lunch, Rudolph P. Miller, well-known consulting engineer formerly connected with the New York City building department, expounded this sentiment.

### PIONEERS OF A NEW SLATE AGE

**S**IXTEEN signatures to the slate association agreement followed immediately the recent slate producers' meeting in New York. Other producers at the meeting had to leave before signing, and still others not at the meeting will not hesitate to join the movement. But these 16 showed without hesitation their faith in the material they produce—a faith which will be justified in a greater industry if the new association properly fulfills its functions. These pioneers are:

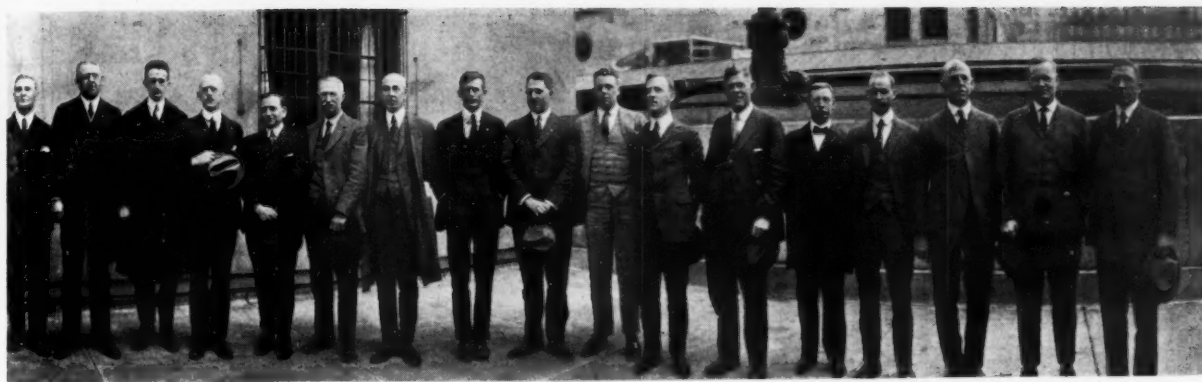
Roscoe C. Berlin, of Slatington, Pa.; William Bray, of Bangor, Pa.; William S. Ditchett, of Bangor; W. L. Doney, of Pen Argyl, Pa.; W. H. Keenan, of Pen Argyl; R. B. Lewis, of Windgap, Pa.; N. M. Male, of Pen Argyl; A. H. Morrow, of West Pawlet, Vt.; E. R. Norton, of Granville, N. Y.; J. E. O'Brien, of Granville; Martin Parsons, of Pen Argyl; Robert Radcliffe, of Bethlehem, Pa.; F. C. Sheldon, of Granville; G. H. Shinville, of Fair Haven, Vt.; William H. Smith, of Bangor; R. S. Whitesell, of Easton, Pa.

"Know what your material is good for and see that it is properly used."

In the afternoon Commissioner Ravelly, commissioner of buildings in the Bronx, talked particularly on labor subjects, and Chairman Bowles presented a paper on the value of trade associations.

Following some discussion it was voted to form a National Slate Association, and all the producers present with the authority to pledge their organization's support to the association did so. An executive committee was chosen, consisting of W. H. Keenan, of Pen Argyl, Pa., chairman; G. F. Barnard, of Boston; Roscoe C. Berlin, of Slatington, Pa.; N. M. Male, of Pen Argyl; E. R. Norton, of Granville, N. Y.; F. C. Sheldon, of Granville, N. Y., and G. H. Shinville, of Fair Haven, Vt. A. H. Morrow, of West Pawlet, Vt., was appointed treasurer. This committee will proceed with the final details of organization, following which officers will be elected.

With present slate sales of \$5,000,000 annually, a tax on each producer of 1 per cent of sales will raise \$50,000, and this is what the association is aiming at for the present. While the activities of the association have not yet been determined, it is likely that a large portion of the association's income will be used in the advertising and promotion of slate as a material for roofing, blackboards, sanitary structural work, electrical and the other uses to which slate is well adapted. The product meets the requirements; it is largely a question of good promotional work to widen the markets and increase the demand for it.



Seventeen more of those who attended the conference in New York on April 20 at which was formed the National Slate Association: N. M. Hale, E. R. Norton, C. S. Darling, G. H. Shinville, R. W. Radcliffe, J. C. Gorsoch, Mr. Hoyt, R. C. Berlin, W. H. Smith, R. S. Whitesell, R. B. Lewis, Wm. Bray, C. A. Long, O. E. Bowles, J. O. Haines, W. L. Doney and Wm. Ditchett

### Highway Industries Exhibitors Organize

THE Highway Industries Exhibitors' Association has been formed following the creation of a temporary exhibitors' committee at the Good Roads Show held in Chicago last January. The directors are as follows:

H. B. Baker, sales manager, Holt Mfg. Co., Peoria, Ill.; E. L. Benedict, vice-president, National Steel Fabric Co., Pittsburgh; Frank Dunn, president, Dunn Wire Cut Lug Brick Co., Conneaut, Ohio; F. G. Hudson, Western manager, Engineering News-Record, Chicago; H. S. Greene, sales manager, Barber-Greene Co., Aurora, Ill.; K. H. Talbot, manager of field service, Koehring Co., Milwaukee; H. R. Snow, manager, Autocar Sales & Service Co., Chicago; S. F. Beatty, vice-president, Austin-Western Road Machinery Co., Chicago; E. O. Wold, vice-president, Russell Grader Mfg. Co., Minneapolis; Russell Grader Mfg. Co., Milwaukee Locomotive Mfg. Co., Milwaukee; C. R. Ege, manager of road department, Portland Cement Association, Chicago; and J. Hittel, Western manager, Asphalt Association, Chicago.

### Rate Reparation Made on Rock, Cement and Gravel

HOLDINGS of unreasonableness and orders of reparation have recently been made or recommended by the Interstate Commerce Commission, as follows:

A holding of unreasonableness and an order of reparation have been made, the latter for \$7402, in No. 12619, Amalgamated Sugar Co. vs. Director-General, as agents, *et al.*, opinion No. 7571, 68 I. C. C., 328-30, as to rates on lime rock from Flux, Utah, to Burley, Paul and McMillan, Idaho. It held the applicable rates, between August 26 and October 30, 1918, to have been unreasonable to the extent they exceeded \$2.75 per net ton. The rates were \$3.50 to

Burley and Paul and \$3.80 to McMillan, yielding car-mile revenue ranging from 58.1 to 61.4 cents for hauls ranging from 283 to 327 miles. Subsequent to the movements a rate of \$2.20 was established. The Commission, however, did not make its reparation to so low a rate.

Examiner Gaddess, in a report on 13260, Gila Water Co. *et al.* vs. Arizona Eastern *et al.*, recommended that reparation made on cement from Crestmore, Calif., to Haysayampa, Ariz., be made on the basis of the rates found reasonable in Arizona Corporation Commission *et al.* vs. Arizona Eastern *et al.* (64 I. C. C. 758). The complaint alleged the rates on cement between the points named were in violation of the first three sections of the interstate commerce law.

A finding of unreasonableness and an award of reparation have been recommended by Examiner Mullen in a report on No. 12005, Police Jury, Caddo, La. vs. St. Louis Southwestern *et al.*, as to rates on gravel from Millville, Ark., to Lucas, La., on which shipments were made between April 24 and June 14, 1920. The examiner said the rates were unreasonable to the extent they exceeded 7.5 cents plus Ex Parte 74 increases. He also recommended an order establishing the rates on that basis for the future.

### Mica Industry in 1921

THE mica industry in 1921 reflected the general depression of business all over the country, according to the Geological Survey. The decrease in the domestic output, sales, and prices, is marked and is not balanced by an increase in the imports. Several mica companies in the South were idle the entire year, and one large company discontinued business entirely.

Preliminary figures show a total of 3,854 short tons, valued at \$174,838. Of this quantity 371 tons was sheet mica; the rest was scrap mica. These figures

are obtained from reports received from 97 per cent of the producers and others engaged in the business.

The production was made by North Carolina, New Hampshire, Virginia, New Mexico, Georgia, South Dakota, Colorado and Wisconsin, named in order of total value of mica sold.

### British Basic Slag as Fertilizer

SPEAKING at a recent meeting of the Bedfordshire Chamber of Agriculture (British) on "Artificial Manures," Dr. E. J. Russell, of the experimental station at Rothamsted, said that the consumption of basic slag had very nearly doubled since 1914. The greater part of the basic slag produced today was from open-hearth furnaces and not nearly so good as that produced in the Bessemer process, which gave 40 per cent of phosphates.

The open-hearth basic slag yielded only from 15 to 30 per cent of phosphates. Some of it was of the same solubility, and gave proportionate results, but the fluor-spar slag produced is much less soluble, slower in action, and not so efficient. The Ministry of Agriculture has appointed a committee of steel and agricultural experts to study the question.

### Standardizing Road-Building Material

THE Bureau of Public Roads will hold a meeting with the highway officials of a group of Eastern states to consider the standardization of certain road-building specifications with the object of economy of construction. Similar meetings with the officials of other states will be held later.

The Bureau states that at present a stone, sand or gravel plant may be supplying road jobs in two states and, due to variations in specifications, the same sizes of material cannot be used on the two jobs for the same classes of work. The plant must use different screens and bins in supplying each job and the result is an increased cost.

# Quarried from Life

By Liman Sandrock

## Gentlemen—F. M. Pinnegar!

ONLY the other day Brother Lamkin, overlord of the National Agricultural Limestone Association and tried and true Kelley Islander, was extolling the merits of the boys in his organization, when our conversation veered toward F. M. Pinnegar. "He is," said Lamkin, "the fine fellow we all think he is in this office"—and home praise goes a long ways. Now let's pass it along.

We venture to assert that the successful city man today is usually a farm product. On the farm he gets his grit, his stability, his powers of assimilation. Mr. Pinnegar was born in Detroit, but he was raised on a Wastenaw county farm by an aunt and uncle, his English father and French mother having passed beyond in his early boyhood.

Having received a common school education, at the age of 16 he started out into the world to make his own way—a characteristic American trait. For several years he worked for the Michigan Central railroad, the Standard Oil Co., and even got a course of training on the Michigan newspapers.

Then it was that he became identified with our great rock products industry. He made connections with the Cowham-McCourtie system of portland cement mills, an organization which promoted, designed, built and operated a chain of cement plants throughout Canada and the United States.

Mr. Pinnegar early proved his worth to the Cowham-McCourtie people and in time became one of its right-hand men in the years that followed. Always studying and striving, his ability as an administrator and his mechanical skill made him of big value to his employers.

When Mr. Cowham died, Mr. Pinnegar resigned and entered the builders' material field, where he again added to his experience. Previous to the World War he was induced by Henry Angel to join the Kelley Island family. He even disposed of a very lucrative business in Detroit to take this new chance with the people who caged the lime tiger and set it to roaring. Here again he showed judgment, vision and discernment—he knew what he was doing.

Today, his associates claim for him a success that is unusual. He is now assistant general sales manager, has charge of the building lime sales, and is a member of the board of directors of the National Lime Association, with head-

quarters in Washington, D. C. We'll say that all this is traveling *some!*

An optimist? Say, if F. M. had a wooden leg, he'd gleefully fasten his sock with a thumb-tack and rejoice in the time he was saving over fastening the regulation garter! All who know him asseverate that he's the greatest optimist in the business. From his viewpoint, there's



F. M. Pinnegar, assistant general sales manager of the Kelley Island Lime and Transportation Co.

never a dark day, for he can always give you a good reason why Tomorrow will be brighter than Yesterday!

## "Just Among Ourselves"—A Real Company Bulletin

THIS is the title of a weekly bulletin of the Rockland and Rockport Lime Corp., Rockland, Me.—a homey, gossipy little gem wherein it is recorded that "Elmer Beebe is quarry crew boss—Barge 705 finished loading 3792 bbl. selected—Who, on the sly, took Pat Burns' pie outen his dinner pail? Whoever did a thing like that should surely go to jail—Supt. Thorndike has a new sedan—Rufus Shibles is trying out a new horse." And Eddie Ahern, running the "co-op." store, is selling cheese and shirts, tripe and toilet paper, shoes and raisins, rubber boots and codfish, at 'way down prices, to the employees. The bulletin is bul'y and fine and chummy, isn't it?

## They Said It!

NATIONAL SAND AND GRAVEL *Bulletin*: When we think of all the time and money devoted to this Association's work by some men who say nothing about it at all, we feel that there is still a very great deal of sincerity and fineness left to us in this old world.

OLD DOC AGSTONE: They're following my prescription to put good humor into both the farm and the farmer—in giving them both more punch and pep.

EDWARD K. CORMACK, president Consolidated Co., Chicago: There is absolutely no possibility of making your business profitable unless you are at the same time willing to make your competitor or your associates in this business profitable. An unprofitable business is a detriment to the state, to the citizen, to the individual.

F. A. STEWART, Kickapoo Sand and Gravel Co.: We are looking for a new location on a more reliable railroad where we can get plenty of cars, low freight rates, and lots of orders at fair prices. Sure, we are still looking. Where is it?

Quarry Managers' Journal (London) says that several skulls dug up in the South Witham limestone quarries suggest an early Roman cemetery. Shows real perspicacity, eh?

MACADAM SERVICE: Licking County Macadam—Headline. Meaning that County Macadam has failed to hold its own against the hated redcoat?

GEORGE J. BOLENDER: The sand and gravel rate structure in Michigan needs an operation and not a tonic.

J. J. SLOAN, Wisconsin Granite Co.: I am heartily in favor of the old adage that charity should begin at home, and I feel that we should do all we can to help the men who help to produce the material for us, and upon whom in many cases we are dependent for the revenue which we get out of our business.

FRED MURPHY, Brownell Improvement Co.: Well, what are we going to have—rain?

OLIVER BOWLES, Bureau of Mines: A study of statistics is the process of feeling the pulse of the industry.

THOMAS SULLIVAN, National Stone Co., Omaha: "When the people get as impatient as the stork, there will be a loud cry for the 365-day road." And he cites the case of a baby girl born in an automobile stuck in the mud, the mother nearly dying before the ambulance could be pulled out of that same mud to come to her assistance.

NORMAN L. HELY, Cape Girardeau, Mo.: Let each member of the Crushed Stone Association report some little trick that he has learned in the quarry business which would be interesting to all other producers. (ROCK PRODUCTS will do its best to pass it along, too.)

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# Editorial Comment

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There's a vast difference between clean, healthy competition, where each competitor stands or falls on his merits, and the old-fashioned, cutthroat **Competition**— game where the more knocks you could **Co-operation** give the other fellow the better you liked yourself. That practice resulted usually in price-cutting, a mutual discrediting among customers, slim profits, and frequent failures. Modern business is built on co-operation as well as on competition, and it is customary to find the leader in co-operation a leader also in successful business.

Tremendous advances have been made in co-operation. Competitors freely visit each others' plants in the search for ideas; trade associations everywhere testify to the present-day appreciation of co-operation.

Much remains to be accomplished, however. Producers and manufacturers who have much in common are still working too much at cross purposes.

Take as an example lime and limestone. In agriculture both are admittedly valuable. Both come from the same raw material. In many cases both are produced by the same producer. Yet each material is claimed to be better than the other, with the too frequent inference that the other is of little value in comparison.

Probably one of the difficulties is a lack of genuine appreciation on the part of each producer for the merits of the competitive product. What would help both products would be a pooling of their present knowledge, of their research and investigational efforts, of their publicity. Unquestionably both materials have value, and without doubt each has more value than the other under certain conditions. If the two industries would actively co-operate, if the lime producer would recommend limestone where limestone is better, and vice versa, farmers would get better results from both products and confidence would be established which would mean increased use of both.

Co-operation between individual organizations of an industry is pretty well established; this co-operation between allied industries is the next step, and the first to take it will be the first to profit by it.

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Lime and limestone aren't the only products which can benefit from co-operation. The same principles apply throughout the rock products industries.

**Pulling Together in Stone** A well-known producer of crushed stone referred the other day to gravel as his **and Gravel** *bete noire*. Probably he was losing business which was going to gravel producers, but in other localities there are gravel producers who are losing business to crushed stone producers.

What's to be done? Shall the crushed stone man tell prospective customers that gravel shouldn't be used and the gravel man say that crushed stone shouldn't be used? The natural result would be a discrediting of both materials, and construction work which might have contained one or the other of these materials will be of brick, terra-cotta, cut stone, or some material where neither aggregate is used.

The thing to do is to co-operate, as producers of both materials have done in some sections, to promote the use of mineral aggregates whether gravel or stone. If more mineral aggregates are used, it's pretty sure that both gravel and crushed stone producers will get their share of the increased business, and that's much more satisfactory in the end than seeing your competitor run out of business by methods which are likely to mean your own ruin also.

The freedom with which producers and manufacturers welcome competitors to visit their plants has been noted as an evidence of present-day co-operation which benefits most **An Evidence of Co-operation** the co-operator. There are some secret processes, the result perhaps of years of effort and large outlays of money, which deserve to be carefully guarded. The rewards rightfully belong to those whose efforts and money were expended.

But there is comparatively little of this. Ordinarily, the more suggestions you can give to the other fellow in your line of business the more suggestions you will get from him for the improvement of your own business, and besides, you get the credit for being wide-awake, progressive, and a leader.

When a slate producer introduces a new product and new processes into his territory, his experiment is naturally watched with interest. If it succeeds, he is likely to face competition; if it fails, his alone will be the loss. Time and effort were expended in the planning, construction, and equipment needed for this new effort, and future competitors may profit from early mistakes, to be sure, but more is likely to be gained than lost by this pioneer through the spirit of co-operation which throws open his plant to all comers for full and complete inspection. The company at least gets the credit and prestige of being a leader in the industry, it gets the good-will of competitors and the benefits of their suggestions, and in any case the "no visitors allowed" attitude can scarcely prevent competitors and possible competitors from starting similar operations on at least as strong a basis as they might if they had visited the first producer's plant.







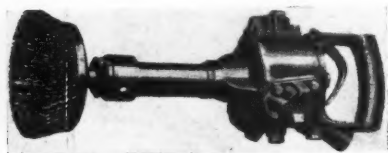


# New Machinery and Equipment

## Wire Brush Cleaner

A HIGH-SPEED cleaner, known as the No. 601 "Little David" wire brush, with a speed of 4200 r.p.m., has been put on the market by the Ingersoll-Rand Co., 11 Broadway, New York. This machine has been successful in cleaning metal surfaces and iron and steel castings.

On a six-weeks' test, states the manufacturers, the machine cleaned steel gondolas,

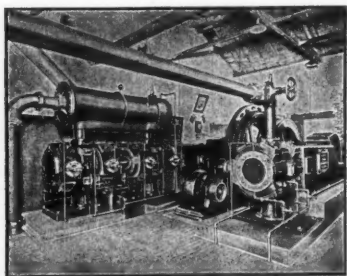


*Brush for cleaning metal surfaces*

each averaging 540 sq. ft. surface in 3½ hr. All-steel box cars, each averaging 1400 sq. ft. surface, were cleaned in 7½ hr. The air motor is of the 3-cylinder type and has been thoroughly tested out in the severe service to which pneumatic grinders are subjected. The machine is simple in construction, well balanced, and operates without vibration. Light weight has been attained by using an aluminum casing reinforced with cast-in steel bushings. The weight of the complete machine is only 14 lb. The average free speed at 90 lb. air pressure is 4200 r.p.m.; length over all, 17½ in., and diameter of wire brush, 6 in.

## Rock Drill Air Compressor

THE designer and builder of the Pyramid valve, the Bury Air Compressor Co., Erie, Pa., has placed on the market the air compressor shown in the illustration.



*Bury rock drill air compressor*

It is the three-cylinder two-stage, variable speed, direct connected to a 650-hp. synchronous motor. It has a capacity of 3500 cu. ft. of air per minute and delivers air at 110 lb. pressure for operating pneumatic rock drills, etc.

## New Marion Electric Shovel

A NEW electric revolving shovel, Model 37, has been put on the market by the Marion Steam Shovel Co., Marion, Ohio.

This company has departed from "single-motor" equipment in this new design—i.e., the independent drive, although many parts used on standard steam machines were retained on the electric outfit. With the exception of the power units, the parts of any model are interchangeable irrespective of the power used.

A direct-connected generating set is installed at the rear of the upper frame, in approximately the same place as the boiler on the steam machine. The "juice" is generated in the special generator from which feed lines lead to the controllers at the front of the machine and have movements identical with the levers on the steam machines. Three controllers are used, one each for the hoisting, rotating and crowding, and from each of these controllers lines lead to their respective motors. The novel characteristics of the control are such that a considerable saving in power is effected.

Each enclosed motor, mounted on a rigid base, is so located that it will not interfere with the use of the standard drums, bearings and shafts. At the front of the upper frame, on the side opposite to the levers, is the motor-driven, direct-connected air compressor which furnishes air for the hoisting

ram and self-locking crowding brake. The compressor is automatic, requiring only occasional lubrication.

In addition to the all-electric shovel, the company furnishes practically the same equipment with gasoline engine drive. On this type the motor generator set is replaced with a four-cylinder, vertical, heavy-duty gasoline engine direct-connected to the generator, the remainder of the machine being of the same construction as the straight electric.

Three standard sizes are now being built and they can be furnished either as gasoline-electric or all-electric. The smallest of the three is Model 21. It carries a 17½ or 20-ft. boom, depending on the character of the work, and is equipped with a full measure ¼-yd. dipper. The intermediate size is Model 32. It carries a 1-yd. dipper. The largest in the group is Model 37, which is equipped with a 1½-yd. dipper.

All of the three models can be equipped with Marion flexible "crawler" trucks, with wide-faced traction or railroad wheels. They can also be converted into dragline, clam-shell or orange-peel excavators or into a material-handling crane by changing the boom and adding a drum for handling the extra line. All parts of the machinery and frame structure are provided for the changes, which can be quickly made in the field whenever occasion demands.



*This revolving electric shovel is mounted on crawling traction trucks*

# News of All the Industry

## Incorporations

The Pennsylvania Sand, Gravel and Supply Co., Pittsburgh, Pa., has been incorporated at \$100,000.

The Bewley-O'Reilly Co., Lockport, N. Y., has been incorporated for \$10,000 by G. C., I. G. and W. E. Bewley.

The Union Rock Co. has been incorporated at Los Angeles, Calif., for \$750,000 and will manufacture crushed stone.

The State Washed Sand and Gravel Co., Milwaukee, Wis., has been incorporated at \$40,000 by T. D. Francey and A. W. Dick.

The Wisconsin Gravel Co., Milwaukee, Wis., has been incorporated for \$25,000 by F. F. Collath, H. P. Mueller and Lydia Collath.

The Oklahoma Rock Asphalt Co., Oklahoma City, Okla., has been incorporated for \$40,000 by M. C. Hess, T. H. Cunn and R. W. Carson.

The Angels Green Stone Co., Richmond, Calif., has been incorporated with a capital stock of \$750,000 and will engage in mining and quarrying green stone.

The Williams-Arvonia Corp. has been incorporated in Richmond, Va., with a capital of \$25,000, to develop slate quarries. J. T. Sloan is president and J. R. Williams secretary and treasurer.

The Presbrey Leland Co. has filed application for a charter with a capital stock of \$5000 to engage in quarrying stone and marble at Nashville, Tenn. Incorporators are W. W. Leland, S. A. Little, M. H. Little, A. T. Adams and R. B. C. Howell.

## Dealers

The W. T. Moodie Tile and Marble Co. has let the contract for the erection of a warehouse in Lincoln, Neb.

The Hayward Lumber Co., Hayward, Minn., has been incorporated for \$25,000 and will handle lime, cement and other building material.

The Building Material Co. has been incorporated in Cedar Rapids, Ia., with a capital of \$100,000 by O. W. Latimer and J. H. Woodside.

The Princeton Building Material Co. has been incorporated in Princeton, W. Va., with a capital stock of \$100,000 by N. J. Jenkins, H. W. Spieden and G. Richardson, all of Bluefield, W. Va.

Montebello, Calif.—The plant and business of the Montebello Artificial Stone Co. was recently purchased by Joseph La Belle, who will conduct the business at the same location.

The Lake City Stone Co., Dunkirk, N. H., has recently been purchased by F. M. Riley, formerly superintendent of the crucible melting department of the Atlas Crucible Steel Co., and in addition to carrying on the manufacture of products will also manufacture cinder building blocks.

Pittsburgh, Pa.—The big boom in the building trade has made a large demand for builders' supplies such as lime, plaster, sand and gravel, cement, etc., according to the Rodgers Sand Co., who attribute this to the fall in prices during the past year.

## Cement

The Atlas Portland Cement Co., Northampton, Pa., has resumed operations at its bag factory.

The National Portland Cement Co., Mount Pleasant, Mich., has increased its capital stock from \$2,000,000 to \$61,400,000.

The King Lung Cement Works, Ltd., of China, has requested registration with the Ministry of Agriculture and Commerce.

The Three Forks Portland Cement Co., Trident, Mont., has resumed operations with a full force of 150 men after a shut-down of a year.

The Pennsylvania Cement Co., Bath, Pa., has placed a force of men at the work of removing topping and big steam shovels will soon be in action.

Dover, Del.—A charter was filed at the State Department today increasing the capital stock of the National Portland Cement Co., Mount Pleasant, Mich., from \$2,000,000 to \$61,000,000.

The International Cement Corp., New York, has closed a contract covering construction work in Havana harbor which will probably involve between 75,000 and 100,000 barrels of cement for delivery this year.

The Sandusky Cement Co. is offering through Stanley & Bissell, Cleveland and Chicago, first mortgage serial 6½ per cent gold bonds dated April 1, 1922. These bonds are to yield from 6½ to 7 per cent according to maturity.

The Hermitage Portland Cement Co. has been incorporated for \$3,000,000 and will operate a plant at Old Hickory, Tenn. Incorporators are T. L. Croteau, M. A. Bruce and C. H. Maxwell, all of Wilmington, Del.

The Louisville Cement Co., which a few months ago had some of its large storage facilities destroyed by fire at its plant in Southern Indiana, has erected a large warehouse, the entire construction being of cement or concrete.

The Dewey Portland Cement Co., Dewey, Okla., has contracted to sell 67,000 bbl. of cement to the Harrison Engineering and Construction Corp., Buffalo, N. Y., to be used in paving the Cannonball road. This will make about 335 carloads of cement.

The Standard Portland Cement Co., Napa Junction, Calif., owned by the Santa Cruz Portland Cement Co., will not be dismantled, but plans to resume operations as soon as conditions warrant such action.

Catskill, N. Y.—The cement plants at Alsen and Cementon are anticipating an active season and all companies have been put in shape for enlarged production under most modern mechanical and economical conditions.

The Indiana Portland Cement Co., Greencastle, Ind., has obtained a contract from the Illinois State Highway Commission to supply 160,000 bbl. of cement to be used on roads in Illinois. No contract prices were announced by the Illinois commission.

The Southwestern Portland Cement Co., Victorville, Calif., plans to enlarge its plant, which will consist of a new kiln 200 ft. long with a diameter of 90 ft., enlarged mill building and power house, new raw mill and driving motor, etc. Preliminary work for the proposed enlargement is going ahead.

Hudson, N. Y.—Cement companies in the vicinity of Hudson, will ship two large loads of cement each week to the barge canal terminal in this city for transportation to New England points via the Boston & Maine Railroad. This will mean the unloading and reloading of between 600 and 800 tons of cement each week at the terminal. The cement companies last season shipped 14 large loads of cement in this way to New England points but the indications are that the shipments will be largely increased this season.

Catskill, N. Y.—The Alpha Portland Cement Co., has about completed the installation of a new conveyor system from the mills to the quarries, a distance of more than a mile. New steel piers have been erected to support the tramway, which extends the entire distance. A modern system of conveyors has been installed that will work automatically both in the crusher room of the mill and at the quarry end. Several changes are being made in the mill, and at their completion the plant will be operated to full capacity with a full force of men.

## Limestone

R. J. Winfrey & Sons, Concord, Tenn., will install two steel kilns for manufacturing lime.

The Castalia Agricultural Lime Co., Castalia, Ohio, recently suffered a \$5000 loss by fire. The cause of the fire is unknown.

The Southern States Lime Corp., Crab Orchards, Tenn., has closed a contract with the paper mills at Jacksonville for all the lime needed in its business for a period of years.

The Pacific Lime and Gypsum Co. has let the contract for the erection of a warehouse at Portland, Ore.

The Franc Stone Co. of Belleview, Ohio, has donated a carload of limestone and its transportation, to be used for demonstration uses on farm lands.

James Gallagher, Jr., and Byron E. Cool have entered into partnership as The Trenton Lime Co., Inc., Remsen, N. Y., as manufacturers of limestone products.

North Adams, Mass.—Damage estimated between \$4,000 and \$5,000 caused by fire in plant of the Hoosac Valley Lime Co. Building containing hydrating and pulverizing department destroyed with its contents. Origin of fire not determined. William Flaherty, president of the concern, stated that damage is covered by insurance.

Greenville, N. C.—After lying idle for several years, the quarry known as the C. M. Wing rock quarry, near Travelers Rest, has again been placed in operation. The business has been sold to the Saluda Crushed Stone Co., and some 75 men have been employed. Resumption of work at the quarry will mean the operation of more freight trains over the Greenville & Northern Railroad, and trains to carry men to and from the quarry now are being operated. The interests operating the quarry are connected with the Saluda Land and Lumber Company. Crushed stone in large quantities is to be sold from the quarry, and its operation is calculated to prove a valuable asset to the county.

## Cement Products

Sanitary Cement Products Co., Cleveland, Ohio, has been incorporated at \$6,000 by B. A. Boonapane and L. J. Albeny.

The Maramonte Cement Block Co. has been incorporated in Milwaukee, Wis., at \$10,000 by C. Maramonte and P. Ross.

The U. S. Concrete Block Co., Pittsburgh, Pa., has been incorporated for \$30,000 and will engage in the manufacture of building blocks.

The Reliance Hollow Cement Block Co., Palmerston, Pa., has begun the erection of a large sand washery which will be completed within a few weeks.

The Logan Concrete Block Co., recently incorporated in Logan, W. Va., has been organized with J. P. Wright, president; J. G. McGuire, secretary and treasurer; George Folkner, manager.

The Washington Cast Stone Block Co., Washington, Pa., plans to enlarge its plant to double its present capacity, and besides manufacturing concrete blocks will add concrete bricks to the list of its products.

The Louisiana Concrete Products Co., Washington, La., has been incorporated with a capital of \$60,000 by A. D. Alderson, Alexandria, La., president, and others, and will erect a plant for the manufacture of roofing tile, artificial stone, etc.

The Dodson Cement Products Co., Wichita, Kans., is constructing an addition to its plant costing \$10,000. The extension will measure 92x62 ft. one story high, and will be used for manufacturing concrete boards and building material.

## Manufacturers

The Erie Clutch and Pulley Co., Erie, Pa., has changed its name and is now doing business under the name Erie Hoist Co. in that city.

The Hiram Phillips Engineering Co. has succeeded W. R. Heagler & Sons, Paragould, Ark., and Hiram and Paul P. Phillips of St. Louis. Mr. Heagler will have charge of the Paragould office, while Paul P. Phillips will have the St. Louis office. The recent professional work accomplished by the new firm includes investigations, reports, plans, designs, estimates, specifications and supervision for the construction and improvement of engineering works.

The Commercial Steel Castings Co., Marion, Ohio, manufacturers of open-hearth steel castings, owing to the increased demand of the Osgood Co. and other customers for steel castings, are reporting a boom for their business never before experienced. To take care of this increase, the company has let contracts for the erection of buildings and additions to its present plant which will enable it to double the output. Work will be started immediately and rushed to completion.

## Sand and Gravel

The Cairo Sand and Gravel Co., Cairo, Ill., has increased its capital from \$30,000 to \$50,000.

The Columbus Sand Co., Columbus, Neb., has purchased the business of the Viergutz Sand Co.

The Rosoff Sand and Gravel Co., Marlboro, N. Y., has resumed operations, and a busy season is expected.

The Cuyahoga Sand and Gravel Co., Cleveland, has been incorporated for \$50,000 by J. M. Truby and H. B. McGraw.

The Bedford-Nugent Sand and Gravel Co., Evansville, Ind., has established a plant at Rockport, Ind., which is already in operation.

The Green Bay Sand and Gravel Co. has been incorporated in Green Bay, Wis., with a capital stock of \$50,000, by H. Bond, F. Hansen and C. Kelly.

The Acme Sand Co., Leesboro, Fla., has been established at Eustis with Orlando parties behind it. They will ship eight cars of sand daily when the equipment is installed.

The Knoxville Sand and Gravel Co., Knoxville, Tenn., has made application for a \$120,000 charter. The incorporators are W. J. Lang, C. E. Paxton, C. S. Todd, F. L. Conner and G. J. Oehler.

The American Sand and Mining Co., in line with the steady improvement of the steel business, has reopened its plant at Festus, Mo. Improved equipment for mining the sand has been installed and an output up to 12 to 14 carloads a day is expected.

Evansville, Ind.—W. Eichel and B. Koenig of the Evansville Sand and Gravel Co. announce the opening of a new sand and gravel plant at Rockport, Ind. An order for 600 carloads of sand will be shipped to Wayne City, Ind., for 18 miles of state highway. The freight charges for 600 cars of sand and gravel will amount to \$30,000.

Livermore, Calif.—Gravel companies along the Alameda creek shores at Niles are resuming operations rapidly, and from 40 to 60 cars of gravel are being shipped daily from Niles. The high water last winter brought down hundreds of tons of gravel to refill the pits which had been nearly drained during last summer's digging. Great increases in building activities and highway construction in all parts of the state have led to a heavy demand for gravel.

## Rock Phosphate

The Archer Phosphate Development Co., Archer, Fla., has been incorporated with a capital of \$75,000, to operate phosphate properties, manufacture fertilizers, etc. W. F. Walker is president, and S. G. Moyes, vice-president, both of Archer.

## Potash

The Pennsylvania Potash and Fertilizer Co., capitalized at \$350,000, and an application already filed to increase it to \$1,000,000, will erect a plant at Williamsport, Pa., which, together with the necessary equipment, will cost between \$130,000 and \$150,000. The output of the plant is already

contracted for for the coming year. The first order to be filled is for 30,000 tons of fertilizer for a farmers' organization in Michigan.

## Quarries

The Hilgartner Marble Co., Baltimore, Md., is enlarging its plant and installing a crane.

The Ohio Granite and Marble Products Co. is planning the erection of a factory and warehouse building to cost about \$100,000. W. F. Jones is president.

Oak Harbor, Ohio.—The Benton Stone Co., recently incorporated here for \$20,000, has bought the Lipstraw & Reese stone crushing plant at Limestone. Its output will be increased by addition of machinery.

The Hydro-Stone Products Co., of Iowa, at Sioux City, has been reorganized and provided with new capital to carry on an enlarged business. The principal products are hydro-stone blocks, cement blocks and artificial stone trim.

The Geneva Stone Corp. has resumed operation of its plant at Oaks Corners, N. Y., and from present indications of building activities, the output of the plant will probably amount to 150,000 tons before the season closes.

## Trade Literature

Rotary Kilns.—The Bennot Co., Canton, Ohio, has recently announced a small catalog giving a general description of the design and mechanical features of its rotary kilns' coolers, autoclaves, etc.

Air Compressors.—The Bury Compressor Co., Erie, Pa., has issued its new Bulletin No. 407. It relates the development of the company since 1902, gives a general description of construction, special features of design, mechanical efficiency, shows interesting applications of the air compressor and also a list of users in the rock products industry.

Steam Shovels.—Circular No. 223, issued by the Marion Steam Shovel Co., Marion, Ohio, says: "Here is a good way to buy any steam shovel." It shows numerous examples of this company's shovels in trench and reclamation work, handling sack, and other material, and 14 points as to the advantages claimed for this type of revolving shovel.

Conveyors.—A handsomely illustrated booklet distributed by the Portable Machinery Co., Passaic, N. J., showing notable applications of its scoop conveyors, low-cleat and high-flight belts; unloading cars, storing material in large quantities with batteries of conveyors; loading motor trucks; stacking and transferring material; general information, including specifications, etc.

Powdered Fuel Equipment.—The Grindle Fuel Equipment Co., Harvey, Ill., has issued its first general catalog on Grindle powdered fuel equipment containing 40 pages of text and illustrations. It sets forth the advantages of powdered fuel, and describes the uses of the Grindle system as applied to that fuel. This catalog will be supplemented from time to time by bulletins describing this system as applied to various classes of work.

Conical Mill.—The Hardinge Co., 120 Broadway, New York City has recently issued a new condensed bulletin covering the Hardinge Conical mill. This bulletin covers concisely the principle of operation of the mill, its adaptability to industrial and metallurgical grinding problems, and

gives general dimensions covering the types of mills, as well as tables showing sizes, powers, and capacities for conditions of grinding.

Roll Crushers.—Catalog 359 of the Jeffrey Mfg. Co., Columbus, Ohio, features its single roll crusher, built in five sizes and adapted for the power house, the cooling station and the mine. The catalog illustrates and describes the crusher's construction and operation, giving typical installations, tables of capacities, and other information for crusher users.

Conveyor Problems.—This is the title of an illustrated booklet issued by the Main Belting Co., Thirteenth and Carpenter streets, Philadelphia. It gives "practical considerations of accepted conveying practice as developed by engineers of authority." Notable examples of scientific belt conveying are shown in full-page halftones. The booklet contains 44 pages of matter interesting to users of belt conveyors.

Compressors and Pumps.—The Pennsylvania Pump and Compressor Co., Easton, Pa., has just issued a Bulletin No. 102 covering Pennsylvania single-stage, straight-line, air compressors and vacuum pumps in both belt and steam-driven types. It describes the Pennsylvania construction as plate valves, both inlet and discharge valve with assembly interchangeable; removable phosphor bronze main bearings; aluminum oil guard; full splash lubrication; float oil gage; solid end connecting rod, together with tables of standard sizes, etc.

## Personal

Sydney R. Hazzard, formerly connected with the A. J. Snyder Cement Co., Rosendale, N. Y., died at his home in Poughkeepsie, on March 24.

Claude M. Crump, a member of the Crump Lime and Cement Co., Memphis, Tenn., died at his home in Memphis recently after an illness of three years, due to paralysis. Mr. Crump was 49 years old.

A. B. Meyer, president of the Mid-West Crushed Stone Company, and of the A. B. Meyer Coal Co., died in his 68th year at his home in Indianapolis. He had been in ill health for more than a year. Mr. Meyer was educated in Indianapolis and Cincinnati and entered the building supply business many years ago. Later, he branched out into the production end and organized the Mid-West Co.

William E. Carson, president and general manager of the Riverton Lime Co., Riverton, Va., has been appointed by Governor Trinkle as a member of the Hampton Roads Port Commission. The local press says: "To his many friends in this part of Virginia the appointment of Mr. Carson is a source of much gratification. As a successful business man, an executive of proven capacity, Mr. Carson is admirably fitted for the duties of this post." The purpose of the commission is to make Hampton Roads one of the greatest ports on the Atlantic coast. This commission will spend approximately \$20,000,000 before its work is completed.

The Technical Publicity Co. (Bissell & Land, Inc.) announces the removal of its offices to 337 Second avenue, Pittsburgh, Pa.

The William S. Walker Co., technical advertising specialists, Pittsburgh, Pa., has moved from the Park building to 227-28 Oliver building.



# Albany

Registered U. S. Patent Office

## For Shafting and Machinery


The trade mark identifies the real Albany Grease—a mark known and respected around the world since 1868, for fair dealing, a quality product and an unexcelled service.

Your dealer stocks it.

**Adam Cook's Sons**  
708 Washington Street, New York

# Grease

## We Look Into the Earth



By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all minerals.

We are fully equipped for testing foundations for bridges, dams, buildings, and all work of a similar character.

**PENNSYLVANIA DRILLING CO.**  
Drilling Contractors  
Pittsburgh, Pa.

When writing advertisers please mention ROCK PRODUCTS

# Used Equipment

Rates for advertising in the Used Equipment Department: \$2.50 per column inch per insertion. Minimum charge, \$2.50. Please send check with your order. These ads must be paid for in advance of insertion.

## RETURN TUBULAR LOCOMOTIVE

## BOILERS

## WATER TUBE SCOTCH MARINE

A LARGE STOCK OF HIGH-GRADE BOILERS OF PRACTICALLY ALL SIZES, TYPES AND MAKES, TAKEN OVER FROM DU PONT CHEMICAL COMPANY'S AND OTHER PLANTS WITH PRODUCTION RECORDS—RECONDITIONED, OFFERED SUBJECT TO ANY INSPECTION, AVAILABLE NOW!

**"SAVE TIME AND MONEY ON YOUR POWER INSTALLATION—  
LET DAVIS FURNISH THE BOILERS"**

LONG DISTANCE  
TELEPHONE  
RANDOLPH 2232

**J. F. DAVIS**

1122-1123-1124  
Harris Trust Building  
CHICAGO, ILL.

### IMMEDIATE DELIVERY

Send Us Your Steam Shovel Inquiries

No. 18K GATES CRUSHER.  
50—75-Hp. Single Drum Holsts, 25 Cy. Motors  
25—40-50-Hp. D. D. Holsts, 60 Cy.  
Nos. 3-5-6-7 1/2 and 8K CRUSHERS.  
6- and 12-Ton Gasoline Locomotives.  
10x12-in. Steam Holst, 3 Drum with Boiler.  
60-Hp. Locomotive Type Boiler.  
150-Hp. Boiler, Butstrap with Stoker, 156 lbs.  
100-TON 2 1/2 YD. ELEC. SHOVEL.  
50 to 5000 ft. Steam, Belt & Elec. Comp's.  
JAW AND ROLL CRUSHERS.  
10—15- and 20-Ton Locomotive Cranes.  
Large amount Contractors' Equip., Towers, Derricks, etc.

Send us your inquiries for Steam Engines, Centrifugal Pumps, Quarry Equip., etc.

ROSS POWER EQUIP. CO.  
Indianapolis, Ind.

### New Large Screens Cheap

78"x25' revolving screen, manganese steel plates 1" thick, holes 1 1/2" diameter.

78"x20' revolving screen, manganese steel plates 1 1/2" thick, holes 5" diameter.

15 complete belt conveyor outfits, all new for 18", 20", 24", 30" and 36" belts.

156' 42" 10-ply bucket elevator belt, with pulleys, gears, etc.—New.

Wm. C. Johnson & Sons Machy. Co.  
1001-3-5 N. 6th St. St. Louis, Mo.

### FOR SALE

2000'—16-lb. Track, 30" gauge.  
12—1-yd. U Dump Cars, 30" gauge.  
3—Turntables.  
6—End Dump Quarry Cars.  
2—Gable Side Dump Cars.  
New and Relay Rails.

IVANHOE EQUIPMENT CO.  
1130 Ivanhoe Road Cleveland, Ohio

### WANT TO BUY

About 40 Sand-Lime Brick Cars, 28" gauge, also Saginaw or Kommick Rotary Sand-Lime Brick Press. Must be in good condition.

The Crume Brick Company  
Dayton, Ohio

### FOR SALE

1—42-ton Standard gauge Baldwin Mogul, 160-lb. Steam.

1—36-ton Standard gauge Baldwin Mogul, 11' wheel base.

2—50-ton Standard gauge Brooks 6-wheel switchers, 160-lb. steam.

1—50-ton Standard gauge Shay geared locomotive.

1—42-ton Standard gauge Shay geared locomotive.

2—23-ton brand new 36" gauge Porter 6-wheel switchers, separate tenders.

2—18-ton O & S 8-wheel two-line locomotive cranes.

1—14-B Bucyrus Steam Shovel, mounted on traction wheels.

Birmingham Rail & Locomotive Co.  
Birmingham, Ala.

### BUCYRUS STEAM SHOVEL PARTS

We are now dismantling a 65-ton 2 1/2-yd. Railroad Shovel. The majority of parts are in good condition. If interested advise requirements.

Walter A. Zelnicker Supply Co., St. Louis  
Rails-Cars-Locomotives-Hoisting Engines-Tanks

### "DREDGING PUMP" FOR SALE

One 10" Morris Sand and Gravel dredging pump, 10" suction, 10" discharge, direct connected to double 9x9 engines.  
One Scotch Marine Boiler, 200 H. P.

M. A. CALLAHAN  
"The Sand Man"  
Schofield Bldg. Cleveland, Ohio

### FOR SALE

One 18" Bonnot Mill; one 24" Symons disc crusher; one No. 6 Austin screen, complete with screen sections. Above items are priced for quick sale. Our reason for selling, enlarging plant.

JOHN D. OWENS & SON CO.  
Owens, Marion County, Ohio

### FOR RENT AND FOR SALE

20—12-yd. Westerns, like new, std. gauge.  
50—60,000-lb. capacity flat and box cars.  
1—Western standard gauge spreader.  
1—Good 18 revolving shovel, traction wheels. No. 794, 1/2-yd. bucket, used 8 months.  
1—Class 14 Bucyrus dragline on caterpillars, 70-ft. boom, 2-yd. bucket, used 6 months.  
1—Marion 76 steam shovel, No. 3503, std. gauge.  
1—No. 2 Brownhoist, 4-wheel gasoline crane, std. gauge, 40-ft. boom, 1/2-yd. bucket, new 1921.  
64—40-ft. NEW 80-lb. 18-in. I beams, not drilled.  
1—NEW Lakewood concrete chuting system.  
6—NEW wood-burning locomotive stacks.

#### LOCOMOTIVES

1—50-ton 18x24-in. six-wheel switcher.  
1—40-ton 17x24-in. four-wheel switcher.  
2—NEW 24-ton six-wheel Porters, separate tender, 36-in. gauge.  
2—18, 14, and 10-ton Vulcans, 36-in. gauge.

INDUSTRIAL EQUIPMENT CO.  
McCormick Building Chicago, Ill.

### FOR SALE

TWO BYERS AUTOCRANES—30 foot boom, 1 yard Orton & Steinbrenner buckets, full enclosed cab; good condition; can be seen working.

Crerar, Clinch & Co. Coal Yard  
Foot of East South Water St., Chicago

### New—RAILS—Relaying

All sections on hand for quick shipment. Reasonable prices quoted. Our stock is very complete.

M. K. FRANK  
Frick Building Pittsburgh, Pa.

### WANTED

To purchase 7 1/2 C Symons Gyratory Crusher. Frame must be solid and not unduly worn. Address with full description, shop number, etc., together with price and general condition to

KEYSTONE COAL CO.  
114 N. George St. York, Pa.

### FOR SALE

Roll Hammer Crusher No. 20; manufactured by Kennedy Van Saun, equipped with two sets of grid screens in perfect order. New shaft, spiders, hammers and grids put in this month.

Kapalo Mfg. Co., Inc., 103 Park Ave., New York City

When writing advertisers please mention ROCK PRODUCTS

# Classified Advertising

Rates for advertising in the Used Equipment Department: \$2.50 per column inch per insertion. Minimum charge, \$2.50. Please send check with your order. These ads must be paid for in advance of insertion.

## FOR SALE

92 acres of high calcium limestone, the purest limestone in the United States. Analysis 99.10 calcium carbonate. Located at St. Genevieve, Mo. For full particulars apply

J. F. SCHUERMANN

Syndicate Trust Bldg. St. Louis, Mo.

## SUPERINTENDENT-MANAGER

Wishes to enter into preliminary negotiations with plaster producer with idea of engagement; technically trained; chemical engineer; executive ability; seven years' experience; thoroughly competent in all phases of gypsum plasters. Western or midwestern location preferred. Address

Box 1565, Care Rock Products  
542 South Dearborn Street Chicago, Ill.

## WANTED

Position as general superintendent of quarry and crushing plant; over fifteen years' experience in construction and operation. First-class references. Address

Box 1563, Care Rock Products  
542 South Dearborn Street, Chicago, Ill.

## WANTED

Position by experienced operator of quarries and crushing plants; good executive ability. Can design or remodel crushing or washing plants if necessary. Address

Box 1561, Care of Rock Products  
542 South Dearborn Street, Chicago, Ill.

## POSITION WANTED

Having disposed of my interests in the Sand and Gravel Business am now open for something in the same line; have had eight years' experience; have had the entire management of our company, and am capable of taking entire charge of, or will take any position with chance for advancement. I know what it takes to make a gravel plant go and pay dividends, and I believe I can satisfy anyone needing a competent man to share some of the burden that goes with the business, and would be pleased to hear from anyone needing help. Have had experience with pumps, belt conveyors, cableways, drags, and industrial machinery; also the different kinds of screening plants. Address

Box 1559, Care Rock Products  
542 South Dearborn Street, Chicago, Ill.

## SUPERINTENDENT

With twenty years' experience in construction and operation of large crushing plants, quarry operations using steam shovels and modern equipment; also cement mill and pulverizing experience, will be open for engagement after June 1st. Address

Box 1564, Care Rock Products  
542 South Dearborn Street, Chicago, Ill.

## WANTED

Superintendent, fully experienced in Quarry, Crusher, Lime Kilns, Well Drilling, Steam Shovels and Office Work, desires position. Can produce results.

Box 1562 Care of Rock Products  
542 South Dearborn Street, Chicago, Ill.

Have you a plant for sale? Do you wish to purchase a plant? Are you in need of a superintendent or manager? Are you looking for a position as plant superintendent or manager? Advertise your wants in these columns for quick results.

## WANTED

Modern gypsum mill with America's purest gypsum deposit wants expert plaster kettle man with references, with or without investment. Address

G. E. ELLSWORTH  
Kearns Building Salt Lake City, Utah

## CHEMIST WANTED

A chemist with some practical experience in the manufacture of portland cement is desired to take charge of the chemical laboratory of a cement plant near Mexico City, Mexico. In replying give full experience and references.

Richard K. Meade & Co.  
11 E. Fayette Street, Baltimore, Md.

## BURNERS WANTED

For cement burning. Must be familiar with oil burning. Write

Monolith Portland Cement Company  
Monolith, Calif.

## SUPERINTENDENT WANTED

with some capital to take charge of a quarry located two miles from a large city, on a paved road; also railroad connections. Address

Box 1557, Care of Rock Products  
542 South Dearborn Street, Chicago, Ill.

# Used Equipment

Rates for advertising in the Used Equipment Department: \$2.50 per column inch per insertion. Minimum charge, \$2.50. Please send check with your order. These ads must be paid in advance of insertion.

## QUARRY EQUIPMENT

4—20 yd. Steel Underframe Side Dump Cars.  
3—16 yd. Steel Underframe Western Dump Cars.  
10—1½ yd. Western Dump Cars.  
2—10x16 Davenport 36 in. ga. Saddle Tanks.  
1—11x16 American 36 in. ga. Saddle Tank.  
1—9x14 Porter 4 ft. 8½ in. ga. Saddle Tank.  
1—¾ yd. Thew "O" Traction Shovel.

Walter A. Zelnicker Supply Co., St. Louis

## WANTED

Second-hand 42" Fuller-Lehigh Mill.  
Fan discharge type.

SECURITY CEMENT & LIME CO.  
Hagerstown, Maryland

## FOR SALE

One Model 60 Marion Steam Shovel, 2½-yd. dipper. Twelve 6-yd. Western Dump Cars, steel sills, steel lined ends and bottom, air brake equipment. One No. 5 Gates "K" Crusher, extra head, gear and pinion. The above equipment is in excellent condition and ready for use. Located in Texas. Address

BOX 617, CORSICANA, TEXAS

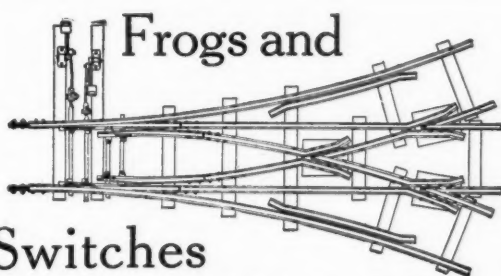
When writing advertisers please mention ROCK PRODUCTS

## F. L. SMIDTH & CO.

50 CHURCH STREET NEW YORK

### Engineers

CEMENT MANUFACTURING PLANTS  
CEMENT MAKING MACHINERY  
PULVERIZED COAL INSTALLATIONS  
GRANULATING AND PULVERIZING  
MACHINES FOR ALL MATERIALS  
FLINT PEBBLES—SILEX LINING  
THE LENIX BELT DRIVE



### Switches

The Central Frog & Switch Co., Cincinnati, O.

Frogs, Switches, Crossings, Switch Stands, Rails, Angle Bars, Fishplates, Throws, Rail Braces, Tie Plates, Portable Track, Etc., Etc.



The WILLIAMS  
"Hercules"

### It Stands Up - because

**TRIANGULAR CONSTRUCTION:** In every WILLIAMS Clamshell, the head bearing is held perfectly rigid by the corner bars meeting in a triangle instead of a quadrangle. Even in the hardest digging, there is no "wobble" to a WILLIAMS. Sheaves are held perfectly in line—saving wear on sheaves and cable.

GET THE WILLIAMS CATALOG. It shows many interesting photos of every kind of clamshell work, and blue prints of the different types of WILLIAMS buckets. Glad to send you a copy—no obligation.

G. H. WILLIAMS CO., Erie, Pa., U.S.A.

# WILLIAMS

**QUICK-ACTING CLAMSHELLS**  
All Parts Guaranteed Against Breakage



### AERIAL TRAMWAY

AUTOMATIC  
ECONOMICAL  
DEPENDABLE

Prompt  
Installations

SEND FOR US

INTERSTATE EQUIPMENT CORPORATION  
25 Church Street New York City

# FLORY HOISTS

CABLEWAYS  
DREDGING MACHINERY

A Flory Hoist for Every Purpose

CATALOG ON REQUEST

S. FLORY MFG. CO.  
BANGOR, PENNSYLVANIA

New York, 95 Liberty St.; Pittsburgh, House Bldg.; Birmingham, Chas. T. Lehman; Chicago, Monadnock Block; Hartford, K. B. Noble Co.; Huntington, W. Va., Banks Supply Co.

### SAUERMAN DRAGLINE CABLEWAY EXCAVATORS

dig, convey, elevate and dump in one operation

Cost data furnished by prominent gravel producers who are using Sauerman equipment backs up our claim that sand and gravel can be excavated and conveyed from pit to plant by one of our drag-line cableway excavators at a lower cost per ton than by using any other equipment or combination of equipment.

Write for Catalog No. 7

Sauerman Bros.  
1140 Monadnock Bldg.  
Chicago

Also Mfrs. of Power Scrapers



## Electric Motors and Generators

for all requirements of the Rock Products Industry

BURKE ELECTRIC CO.

Main Office and Works  
Erie, Penna.

Service Sales Offices  
Cleveland  
Philadelphia

Detroit  
Pittsburgh

Sales Agencies  
Underwood Electric Co., Cincinnati  
W. T. Osborn, Kansas City.

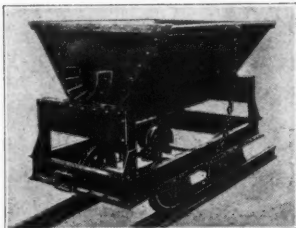
## The Morgan Producer Gas Machine

is the highest class gas producer built in the U. S. and is advertised in this journal the second issue of each month.

Morgan Construction Company  
Worcester, Mass.

Pittsburgh Office: 704 Arrott Bldg. Telephone Court 1381

## Strongest and Cheapest Quarry Car



on the market. That is what quarry men tell us who are using our Standard 72" Side Dump Quarry Car for 24" standard gauge track.

Equipped with Steel Pin Rockers and Brass Journals that can be replaced instantly.

Write for Complete Details and Prices.

### GEHRET BROTHERS

Manufacturers of Structural Steel, Ornamental Iron Work, Quarry Cars, etc.  
Bridgeport, Montgomery County, Pa.

# CARS

WE MAKE CARS FOR  
COAL, ORE, STONE, SAND, GRAVEL,  
CLAY AND BRICK, DRYER AND INDUSTRIAL  
CARS. THE WATT FACTORY IS THE LARGEST IN  
THE WORLD DEVOTED ALONE TO CAR BUILDING  
OVER 50 YEARS' EXPERIENCE

### CATALOGS

The Watt Mining Car Wheel Co.  
BARNESVILLE, OHIO



### BYERS Model "10" Full Circle Crane

OPERATOR can raise or lower the boom under absolute control while lifting or dropping bucket, rotating, or traveling. Exclusive Byers feature; many other points just as important—study them all in interesting Bulletin, just out.

\*\*\*

The Byers Machine Co.  
310 Sycamore St., Ravenna, O.  
Agents in Leading Cities

## THE McMYLER

THERE is power built into each machine, a ruggedness that can be depended on to stretch out into months and years of flawless service.

Try out the Type "J" Locomotive Crane and its operation will convince

THE McMYLER INTERSTATE CO.  
Cleveland, Ohio

### BRANCH OFFICES:

New York City, 1756 Hudson Terminal Building	San Francisco, Calif., 766 Folsom Street
Chicago, Ill., 812 Edison Bldg.	New Orleans, La., 444 Maison Blanche Annex
Seattle, Wash., Hoge Building	Birmingham, Ala., Brown - Mark Building
Denver, Colo., 18th and Wazee Streets	Boston, Mass., 261 Franklin St.



**OHIO**  
LOCOMOTIVE  
CRANES  
OHIO LOCOMOTIVE CRANE CO.  
DUYRUS, OHIO

## TERRY FAMOUS DERRICK IRONS, FITTINGS AND ERECTORS' TOOLS



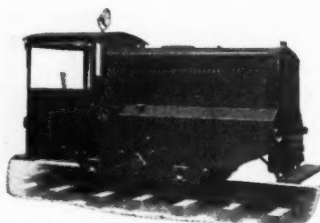
LET US SOLVE YOUR MATERIAL HANDLING PROBLEMS.

All Types of

Steel and Timber  
DERRICKS

**TERRY**

## Minster Gasoline Industrial Locomotives



Model "F"—Six Ton

The Industrial Equipment Co.  
310-316 Ohio Street  
Minster, Ohio  
Formerly the Cummings Machine Company

### GUARANTEE ECONOMICAL PRODUCTION

There is great satisfaction in good equipment.

We have a size for your purpose.

Experience, the Best of Material, Careful Workmanship, and Rigid Inspection Enable Us to Maintain Leadership.

Eastern and Export Dept.  
The Herbert Crapster Co., Inc.  
1 Madison Avenue  
New York City

When in the market for machinery or equipment, look through the advertisements of ROCK PRODUCTS. If you do not find what you want advertised in this issue, write us and we will put you in touch with reliable firms who can supply your need. This service is free to our readers. Use it.

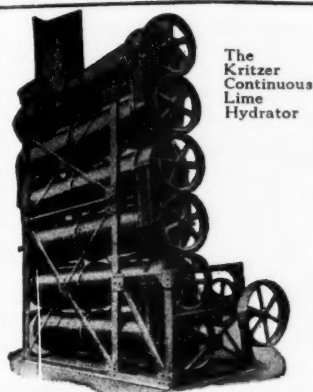
## Rock Products

The Nation's Business Magazine of the  
Rock Products Industry

542 So. Dearborn St.

Chicago, Illinois

When writing advertisers please mention ROCK PRODUCTS



The  
Kritzer  
Continuous  
Lime  
Hydrator

## HYDRATE

Years ago we helped our customers create a demand for their hydrate. Today the demand exceeds the supply. That's why every lime manufacturer should have an efficient, economical hydrating plant.

THE KRITZER Continuous Lime Hydrator is efficient in production and economical in operation and maintenance. Let us investigate exhaustively the local conditions peculiar to your proposition, and then apply our experience of many years and design a plant to meet those conditions.

*A KRITZER plant, scientifically adapted to your conditions, will give you the best product at lowest cost*

### THE KRITZER COMPANY

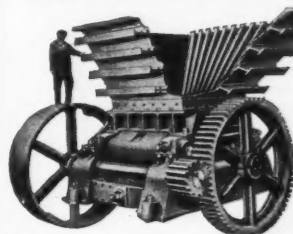
503 South Jefferson Street

CHICAGO, ILL.

## PERFORATED SCREENS and Steel Plate Work

W. TOEPFER & SONS COMPANY  
Milwaukee Wisconsin

### "PENNSYLVANIA" Single Roll Crusher



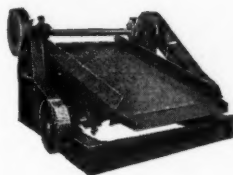
The New Series of "Pennsylvania" Single Roll Crushers take steam-shovel feed of limestone, cement rock, gypsum and similar materials, — wet and sticky, — without feeder, and make maximum reduction in one operation. All parts readily accessible. Maintenance cost lower per ton than for any other type. Massive construction — Reliable Safety Devices — Convenient adjustment. Capacities 5 to 450 tons hourly.

Put Your Reduction Problems Up to Us

**PENNSYLVANIA**  
CRUSHER COMPANY  
Stephen Girard Bldg., Philadelphia

New York  
Pittsburgh

### A ROBINS PERFEX SCREEN



will screen your SAND and GRAVEL, better and cheaper than any other screen. IT IS ABSOLUTELY FREE FROM VIBRATION, and takes but little power.

Write for Bulletin No. 58-R

ROBINS CONVEYING BELT CO.

New York Chicago Pittsburgh Boston



### Gruendler Hercules Crushers

Gruendler Hercules Crushers are reducing production costs in hundreds of plants throughout the country.

#### "America's Famous Crushers"

For Crushing and Pulverizing Limestone, Lime, Gypsum, Shale, etc., a Gruendler cannot be beat.

Write for Interesting Bulletin

Gruendler Patent Crusher & Pulverizer Company  
908 North Main Street St. Louis, Mo.

## SCREENS OF ALL KINDS



Chicago Perforating Co.  
2445 West 24th Place  
Tel. Canal 1459 CHICAGO, ILL.



## BACON-FARREL ORE & ROCK CRUSHING-WORLD KNOWN ROLLS-CRUSHERS

EARLE C. BACON, INC. ENGINEERS  
26 CORTLANDT ST., NEW YORK

## By the very nature of the work

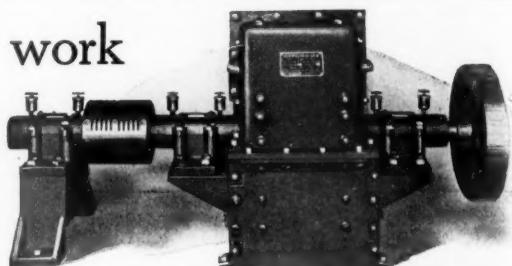
it is called upon to perform a pulverizer must be much stronger than the material it handles.

Only **STEEL** will stand the stress  
**"K-B"** is built **ALL-Steel**

*Catalog with full particulars on request*

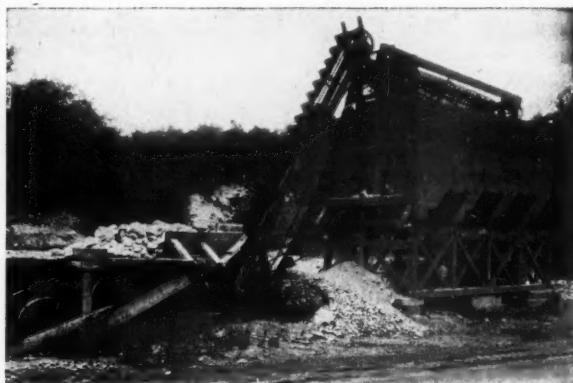
**K-B PULVERIZER COMPANY, Inc.,**

92 Lafayette St.  
 NEW YORK



## Now is the Time

to prepare for the big demand for crushed stone that is surely coming. If you are considering enlarging your present plant, or if you expect to install a new plant, we will appreciate the opportunity to submit information concerning our Champion Crushers, Elevators, Screens, Conveyors, etc.

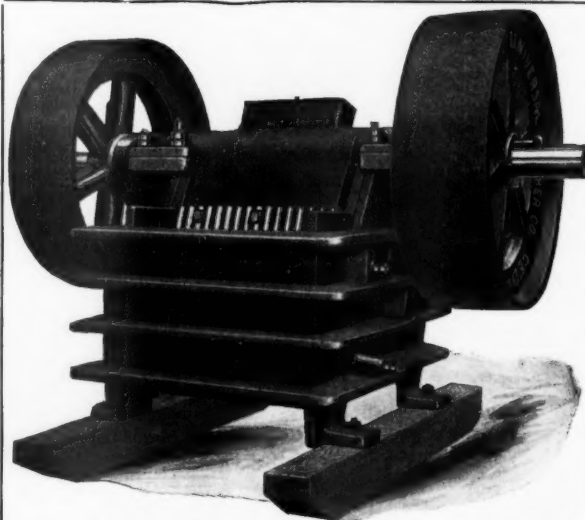


**A Small Stationary Rock Crushing Plant**

One of the several thousand Crushing Outfits of our make that are used in every part of the world.

Write today for copy of crusher catalogue

**The Good Roads Machinery Company, Inc.**  
 Kennett Square, Pa.



## UNIVERSAL STEEL LINE

THE PERFECT GRAVEL AND REJECTION CRUSHER

Sizes up to 8"x36". Capacities 20 to 200 tons daily. Crushes to 3/4" and finer if desired. Has no superior for FINE CRUSHING and UNIFORMITY of product.

STRONG LIGHT DURABLE ECONOMICAL  
**UNIVERSAL CRUSHER CO.**

225 Third Street Cedar Rapids, Iowa, U. S. A.

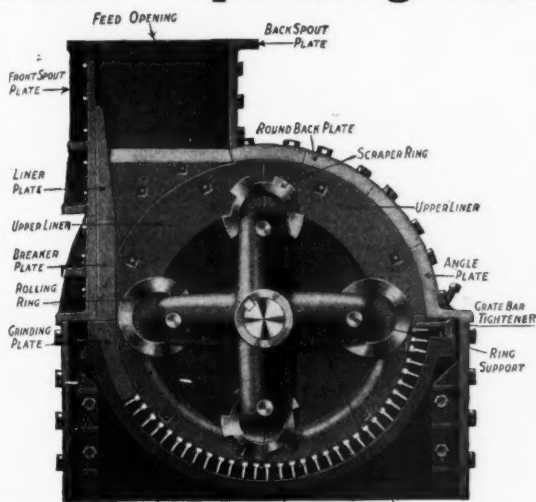
# STURTEVANT "ONE-MAN ONE-MINUTE" "OPEN-DOOR" MACHINERY

*Crushing, Grinding, Pulverizing,  
 Screening, Sizing, Air Separating, Mixing,  
 Weighing, Elevating and Conveying Machinery  
 Complete Units    :-    :-    Engineering Service*

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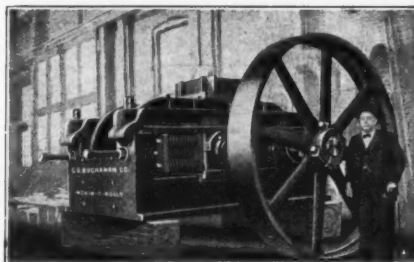
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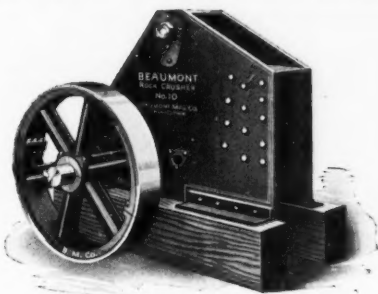
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Immediate Shipment can be made on above size Crushers.

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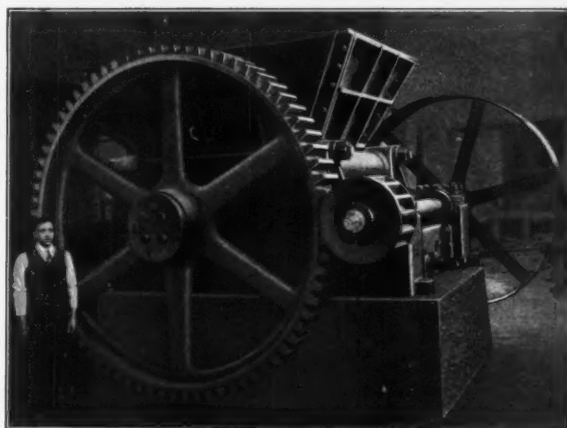
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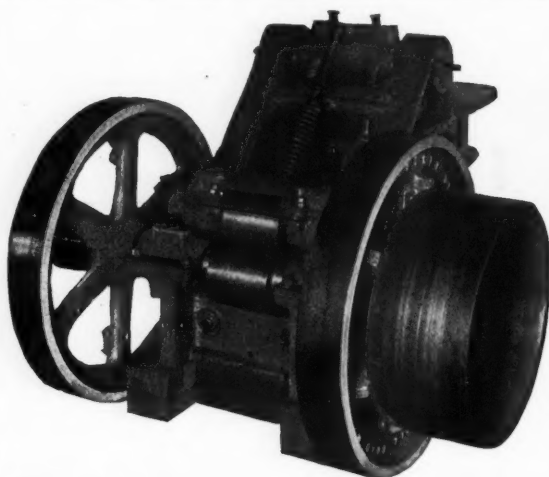
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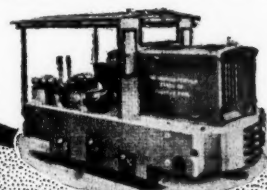
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in hard  
ROCK WORK**

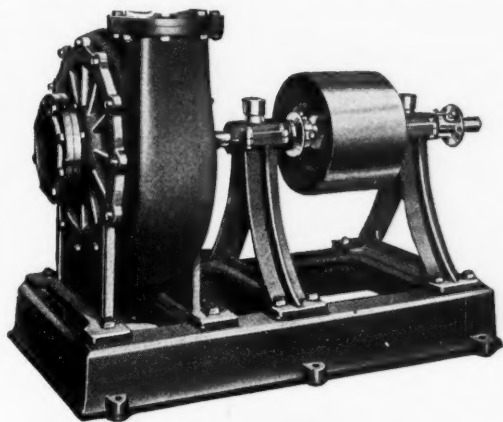
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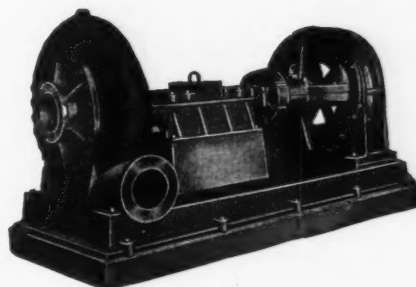
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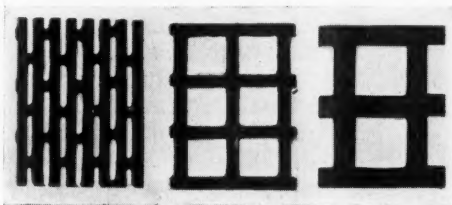
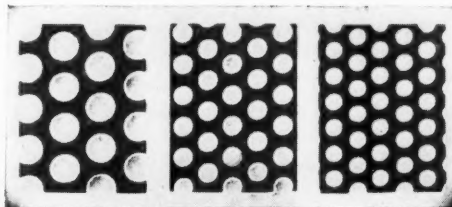
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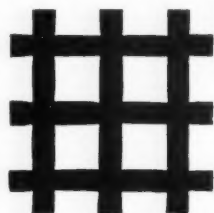
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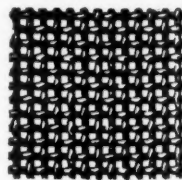
2 1/2 mesh; .105 wire

3573 East 78th Street

A uniform fineness is assured by the use of "Cleveland" Double Crimped Wire Cloth, making it unequalled for the screening of Sand, Gravel, Crushed Stone and Cement. "Service" is the definite policy of this organization, and through every phase of manufacture this end is constantly before us.

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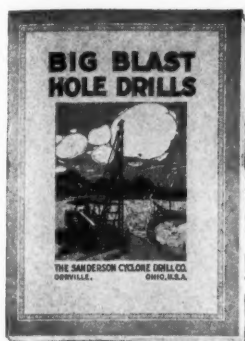
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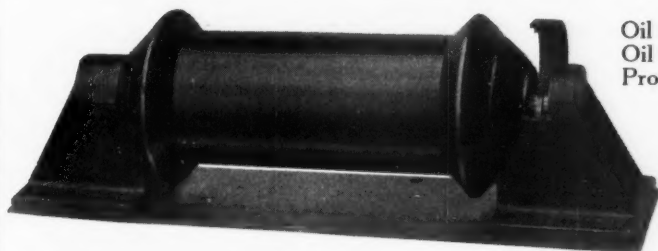
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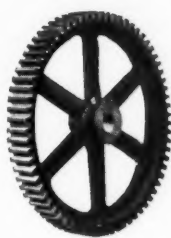
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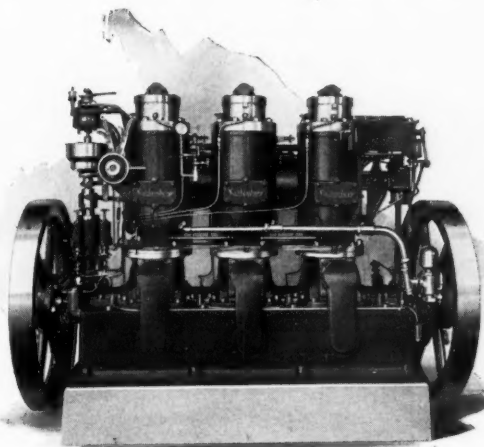
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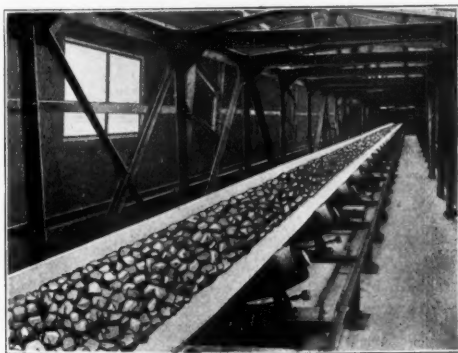
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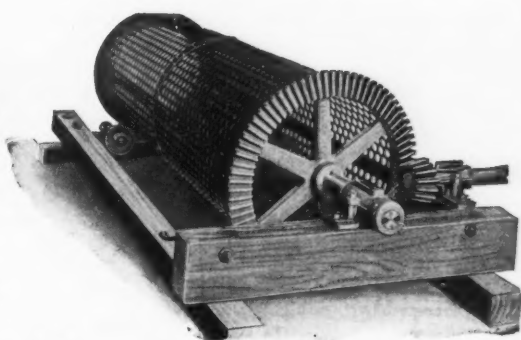
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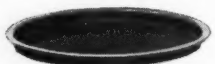
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For one year we have been offering the lime and cement field the services of the Draper Steel Barrel. Results have so far justified our efforts that we feel impelled to say to every producer that the advent of our steel barrel in this field has marked an epoch in the shipping of rock products.

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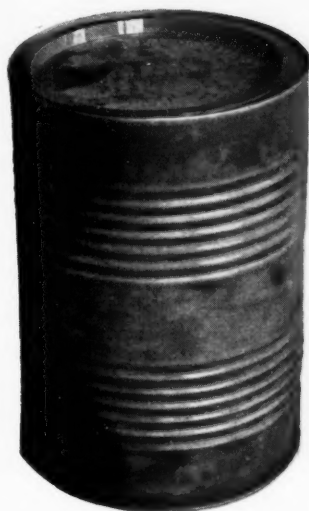
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We are manufacturers of machinery for the making of steel barrels that are atmospheric proof without soldering or welding, and as a proof of the efficiency of the containers, it is conservatively estimated that 15,000,000 are manufactured each year by the "Stoll" equipment, as practically all of the largest chemical companies have them.

We would like to give you complete information  
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you money

**D. H. STOLL CO., INC.**  
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## The Wooden Barrel is Superior



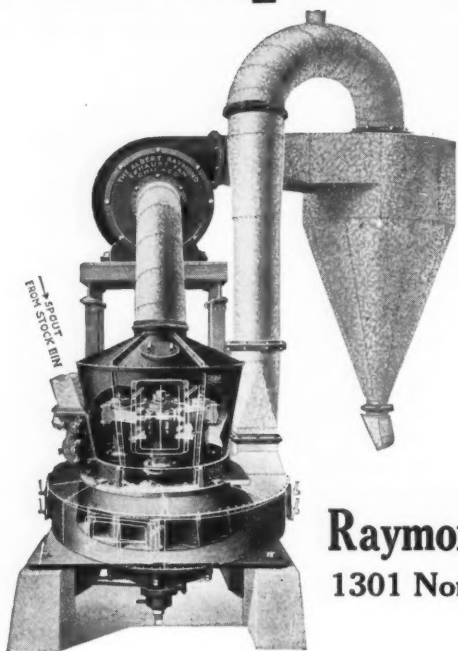
THIS organization maintains for your convenience, fifty-one barrel plants and warehouses in all of the states east of the Mississippi River, and owns or controls the output of a large number of stave and heading mills located in the timber districts of the Southwest. Therefore we are prepared to deliver the "Best Barrels Built," made of tongued and grooved staves, glued heading, thoroughly kiln dried, and bound with wood, wire or steel hoops to meet your requirements.

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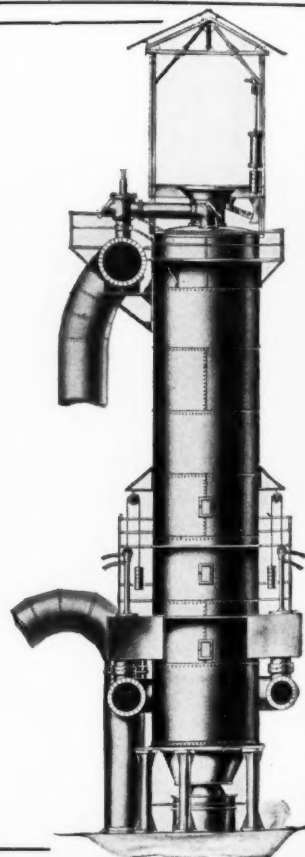
## Continuous Discharge—Gas Fired LIME KILNS

The wastefulness of efficiency of any lime burning apparatus is determined by the amount of fuel per ton of lime produced.

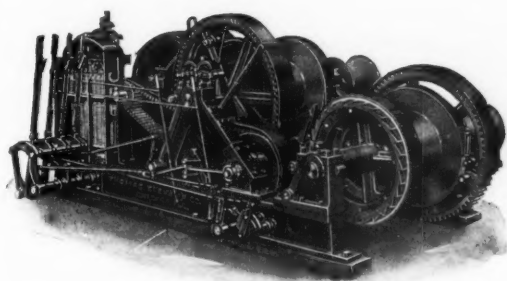
Our Kilns are not an experiment, but have successfully met the test of years of actual service. The design is the work of our Consulting Mechanical and Chemical Engineer, who has had many years of practical operative experience. They embody a number of labor saving devices, and are designed to secure maximum production with minimum fuel consumption; their record in this respect should interest every lime producer in the country.

**Glamorgan Pipe & Foundry Company**  
Lynchburg, Va., U. S. A.

Using the Nationally Famous Virginia Foundry Irons



*When writing advertisers please mention ROCK PRODUCTS*



# THOMAS HOISTS

Steam and Electric  
Single and Two Speed Types

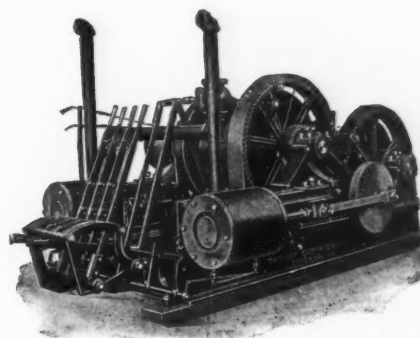
*For*

Dragline Cableways  
Drag Scrapers  
Derricks  
Bucket Operation  
Car Haulage

## THOMAS ELEVATOR CO.

27 South Hoyne Avenue

Chicago, Ill.



View in a cement quarry showing a bank of well broken stone after a deep well-drill blast in which Cordeau-Bickford was used as the detonating agent for the explosive.

## USE Cordeau-Bickford Detonating Fuse

For well drill blasting and the tunnel and pocket method of blasting where large quantities of explosive are to be detonated, use safe, efficient Cordeau-Bickford and get lower blasting costs.

**THE ENSIGN-BICKFORD CO., SIMSBURY, CONN.**  
Established 1836 Original Makers of Safety Fuse

# Buyers' Directory

## of the Rock Products Industry

Classified Directory of Advertisers in Rock Products

**AERIAL TRAMWAYS**  
Interstate Equip. Co., New York, N. Y.

**AUTOMATIC WEIGHERS**  
Schaffer Eng. & Equipment Co., Pittsburgh, Pa.

**BAGS AND BAG MACHINERY**  
Bates Valve Bag Co., Chicago, Ill.  
Jaite Co., The, Jaite, Ohio.  
Valve Bag Co. of America, Toledo, Ohio.

**BARRELS—Lime**  
Draper Mfg. Co., The, Cleveland, Ohio.  
International Cooperage Co., Niagara Falls, N. Y.  
Sandusky Cooperage & Lbr. Co., Toledo, Ohio.  
Stoll, D. H., Co., Buffalo, N. Y.

**BELTING**  
New York Belting & Packing Co., New York, N. Y.

**BINS**  
Brown Hoisting Machinery Co., Cleveland, O.  
Neff & Fry, Camden, Ohio (concrete stone)  
Weller Mfg. Co., Chicago, Ill. (storage)

**BIN GATES**  
Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
Bacon, Earle C., Inc., New York City.  
Brown Hoisting Machinery Co., Cleveland, Ohio.  
Link-Belt Co., Chicago, Ill.  
Sturtevant Mill Co., Boston, Mass.  
Traylor Eng. & Mfg. Co., Allentown, Pa.  
Weller Mfg. Co., Chicago, Ill.

**BLASTING SUPPLIES**  
Atlas Powder Co., Wilmington, Del.  
Du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.  
Grasselli Powder Co., Cleveland, Ohio.  
Hercules Powder Co., Wilmington, Del.

**BOILERS, WASTE, HEAT**  
Edge Moor Iron Co., Edge Moor, Del.  
Freeman Mfg. Co., Racine, Wis.

**BRICK MACHINERY**  
Besser Sales Co., Chicago, Ill.  
Shope Brick Co., Portland, Ore.

**BUCKETS—Elevator**  
Brown Hoisting Machinery Co., Cleveland, O.  
Haiss Mfg. Co., Inc., Geo., N. Y. City, N. Y.  
Hendrick Mfg. Co., Carbondale, Pa.  
Jeffrey Mfg. Co., Columbus, O.  
Orton & Steinbrenner, Chicago, Ill.

**BUCKETS**  
Blaw-Knox Co., Pittsburgh, Pa.  
Brown Hoisting Machinery Co., Cleveland, Ohio.  
Browning Co., Cleveland, Ohio.  
Haiss Mfg. Co., Inc., Geo., N. Y. City, N. Y.  
McMyler Interstate Co., Cleveland, Ohio.  
Owen Bucket Co., Cleveland, Ohio.  
Williams Co., G. H., Erie, Pa.

**CABLEWAYS**  
Blaw-Knox Co., Pittsburgh, Pa.  
S. Flory Mfg. Co., Bangor, Pa.  
Interstate Equip. Co., New York, N. Y.

**CALCINING MACHINERY**  
Atlas Car & Mfg. Co., Cleveland, Ohio.  
Butterworth & Lowe, Grand Rapids, Mich.  
Ehram & Sons Co., J. B., Enterprise, Kans.

**CARS—Quarry and Industrial**  
Atlas Car & Mfg. Co., Cleveland, Ohio.  
Easton Car & Constr. Co., Easton, Pa.  
Gehret Bros., Bridgeport, Pa.  
Kilbourne & Jacobs Mfg. Co., Columbus, O.  
Watt Mining Car Wheel Co., Barnesville, Ohio.

**CAR DUMPERS**  
Car Dumper & Equip. Co., Chicago, Ill.

**CAR PULLERS**  
Weller Mfg. Co., Chicago, Ill.

**CEMENT MACHINERY**  
Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
Kennedy-Van Saun Mfg. & Eng. Corp., N. Y. City.

**CEMENT MILL REPAIRS**  
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

**COMPRESSORS, AIR**  
Ingersoll-Rand Co., N. Y. City.

**CONVEYORS AND ELEVATORS**  
Caldwell, H. W., & Son Co., Chicago, Ill.  
Haiss Mfg. Co., Inc., Geo., N. Y. City, N. Y.  
Jeffrey Mfg. Co., The, Columbus, Ohio.  
Kennedy-Van Saun Mfg. & Eng. Corp., New York City.  
Link-Belt Co., Chicago, Ill.  
Smith Eng. Works, Milwaukee, Wis.  
Robins Conveying Belt Co., New York City.  
Stephens-Adamson Mfg. Co., Aurora, Ill.  
Sturtevant Mill Co., Boston, Mass.  
Universal Road Mach. Co., Kingston, N. Y.

**CRANES—Locomotive Gantry**  
Ball Engine Co., Erie, Pa.  
Brown Hoisting Machinery Co., The, Cleveland, Ohio.  
Byers Mach. Co., The, Ravenna, Ohio.  
Erie Steam Shovel Co., Erie, Pa.  
McMyler-Interstate Co., Cleveland, Ohio.  
Ohio Locomotive Crane Co., Bucyrus, Ohio.  
Orton & Steinbrenner, Chicago, Ill.  
Osgood Co., The, Marion, Ohio.

**CRUSHERS AND PULVERIZERS**  
Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
American Pulverizer Co., St. Louis, Mo.  
Austin Mfg. Co., Chicago, Ill.  
Bacon, Earle C., Inc., New York, N. Y.  
Bradley Pulverizer Co., Allentown, Pa.  
Buchanan Co., Inc., C. G., New York, N. Y.  
Butterworth & Lowe, Grand Rapids, Mich.  
Chalmers & Williams, Chicago Heights, Ill.  
Dixie Crusher Co., St. Louis, Mo.  
Fuller-Lehigh Co., Fullerton, Pa.  
Good Roads Machinery Co., Kennett Square, Pa.  
Gruendler Pat. Crusher Co., St. Louis, Mo.  
Jeffrey Mfg. Co., The, Columbus, Ohio.  
Kaltenthaler, H. J., Philadelphia, Pa.  
K. B. Pulverizer Co., New York, N. Y.  
Kennedy-Van Saun Mfg. & Eng. Corp., New York, N. Y.  
Kent Mill Co., Brooklyn, N. Y.  
Lewistown Fdry. & Mach. Co., Lewistown, Pa.  
McLanahan-Stone Mach. Co., Hollidaysburg, Pa.  
Munson Mill Machinery Co., Utica, N. Y.  
New Holland Machine Co., New Holland, Pa.  
Pennsylvania Crusher Co., Philadelphia, Pa.  
Raymond Bros. Impact Pulv. Co., Chicago, Ill.  
Smidth & Co., F. L., New York, N. Y.  
Smith Eng. Works, Milwaukee, Wis.  
Sturtevant Mill Co., Boston, Mass.  
Traylor Eng. & Mfg. Co., Allentown, Pa.  
Universal Crusher Co., Cedar Rapids, Iowa.  
Universal Road Mach. Co., Kingston, N. Y.  
Williams Pat. Crush. & Pulv. Co., Chicago, Ill.

**CRUSHER REPAIRS—Manganese Steel**  
American Manganese Steel Co., Chicago Heights, Ill.  
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

**CLUTCHES**  
Weller Mfg. Co., Chicago, Ill.

**DERRICKS**  
Terry Mfg. Co., New York, N. Y.

**DIPPER TEETH**  
American Manganese Steel Co., Chicago Heights, Ill.  
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

**DREDGING MACHINERY**  
S. Flory Mfg. Co., Bangor, Pa.

**DRILLS**  
The Loomis Machine Co., Tiffin, Ohio.  
Sanderson Cyclone Drill Co., Orrville, Ohio.  
Wood Drill Works, Paterson, N. J.

**DRILLERS**  
Pennsylvania Drilling Co., Pittsburgh, Pa.

**DRYERS**  
American Process Co., New York City.  
The Reeves Bros. Co., Alliance, O.  
Vulcan Iron Works, Wilkes-Barre, Pa.  
Weller Mfg. Co., Chicago, Ill.

**DUST COLLECTING SYSTEMS**  
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

**DYNAMITE**  
Atlas Powder Co., Wilmington, Del.  
Du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.  
Grasselli Powder Co., Cleveland, Ohio.  
Hercules Powder Co., Wilmington, Del.

**ENGINES—Steam**  
Morris Mach. Works, Baldwinsville, N. Y.

**ENGINES—Oil**  
Kahlenberg Bros. Co., Two Rivers, Wis.

**ENGINEERS**  
Arnold & Weigel, Woodville, Ohio.  
Artingstall, S. G., Jr., Chicago, Ill.  
Austin Co., The, Cleveland, Ohio.  
Bacon, Earle C., Inc., New York, N. Y.  
Buckbee Co., J. C., Chicago, Ill.  
Ehram & Sons Co., J. B., Enterprise, Kans.  
Federal Bridge & Structural Steel Co., Waukegan, Wis.  
Fuller Engineering Co., Allentown, Pa.  
James N. Hatch, Chicago, Ill.  
R. W. Hunt & Co., Chicago, Ill.  
Randolph-Perkins Co., Chicago, Ill.  
Smidth & Co., F. L., New York, N. Y.  
Schaffer Eng. & Equip. Co., Pittsburgh, Pa.  
Waller Crow, Inc., Chicago, Ill.  
Webster Mfg. Co., Chicago, Ill.

**EXCAVATORS**  
Ball Engine Co., Erie, Pa.  
Brown Hoisting Machinery Co., Cleveland, O.  
Erie Steam Shovel Co., Erie, Pa.  
Owen Bucket Co., Cleveland, Ohio.

**EXCAVATORS—Dragline Cableway**  
Link-Belt Co., Chicago, Ill.  
Saurman Bros., Chicago, Ill.

**EXPLOSIVES**  
Atlas Powder Co., Wilmington, Del.  
Du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.  
Grasselli Powder Co., Cleveland, Ohio.  
Hercules Powder Co., Wilmington, Del.

**FUSES**  
Ensign-Bickford Co., Simsbury, Conn.

(Continued on page 80)



### Get a **HAISS Belt Conveyor** With Hopper Attachment

It will cut down the cost of measuring materials, while loading them more rapidly.

No guess work, no calculations and no checking; the operation becomes an automatic one.

It's the practical, logical solution for many of the contractor's jobs. In this year of keen competition it is needed more than ever, for the contractor who has the equipment to speed work and reduce its cost can take contracts on a price basis and still make money.

#### A Word with the Haiss Engineer

Here are a few of the many good points of the Haiss Portable Belt Conveyor.

Steel Rollers, turning on ball bearing shafts—saving power and reducing the strain on the belt.

A Four-way Adjustable Bearing for the belt pulley insures keeping the belt in proper alignment and saves belt wear.

A Take-up Bearing at the head and belt pulley takes up slack of belt, preventing slippage, making for longer belt life.

Ask for Bulletin No. 321

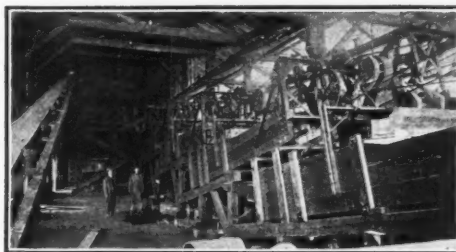
**The George Haiss Mfg. Company, Inc.**  
139th St. and Park Ave. New York, N. Y.

ESTABLISHED 1892

*Representatives throughout the world*  
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## Washing Phosphate Sands



DORR CLASSIFIERS OF THIS TYPE ARE  
EXTENSIVELY USED FOR THIS PURPOSE

## The Dorr Classifier

eliminates many-stage washing by handling a number of stages in a single unit; cuts down head-room; greatly reduces the amount of pumping required; may be readily moved from one location to another.

The Dorr Thickener is also used for the recovery of very fine sand that would otherwise be lost. It operates continuously, requires no attendance, uses little power, and can be installed out-of-doors.

Let us tell you how

## The Dorr Company Engineers

101 Park Avenue  
Denver New York London

RESEARCH TESTS DESIGN EQUIPMENT

When writing advertisers please mention **ROCK PRODUCTS**

# Buyers' Directory

## of the Rock Products Industry

Classified Directory of Advertisers in Rock Products

(Continued from page 78)

### GAS PRODUCERS

Morgan Construction Co., Worcester, Mass.

### GEARS

Caldwell, H. W., & Son Co., Chicago, Ill.  
Plamondon Mfg. Co., Chicago, Ill.

### GENERATORS

Burke Electric Co., Erie, Pa.

### GLASS SAND EQUIPMENT

Lewistown Fdy. & Mach. Co., Lewistown, Pa.

### GRATES

The Kramer Bros. Fdy. Co., Dayton, Ohio.

### GRINDING MILLS

Munson Mill Machinery Co., Utica, N. Y.

### HOISTS

Flory Mfg. Co., S., Bangor, Pa.  
Thomas Elevator Co., Chicago, Ill.  
Vulcan Iron Works, Wilkes-Barre, Pa.  
Weller Mfg. Co., Chicago, Ill.

**HOSE**—Water, Steam, Air Drill, Pneumatic Tool  
Cincinnati Rubber Mfg. Co., Cincinnati, Ohio.  
Ingersoll-Rand Co., New York City.  
N. Y. Belting & Packing Co., New York, N. Y.

### HYDRATING MACHINERY

Atlas Car & Mfg. Co., Cleveland, Ohio.  
Kritzer Co., The, Chicago, Ill.  
Miscampbell, H., Duluth, Minn.  
Schaffer Eng. & Equip. Co., Pittsburgh, Pa.  
Toepfer & Sons Co., W., Milwaukee, Wis.

### HYDRAULIC DREDGES

Morris Machine Works, Baldwinville, N. Y.

### LIME HANDLING EQUIPMENT

Weller Mfg. Co., Chicago, Ill.

### LIME KILNS

Arnold & Wiegel, Woodville, Ohio.  
Glamorgan Pipe & Fdy. Co., Lynchburg, Va.  
Vulcan Iron Works, Wilkes-Barre, Pa.

### LOADERS AND UNLOADERS

Ball Engine Co., Erie, Pa.  
Brown Hoisting Machinery Co., Cleveland, O.  
Erie Steam Shovel Co., Erie, Pa.  
Haiss Mfg. Co., The Geo., New York City.  
Jeffrey Mfg. Co., The, Columbus, Ohio.  
Orton & Steinbrenner, Chicago, Ill.

### LOCOMOTIVES

Baldwin Locomotive Works, The, Philadelphia, Pa.  
Brookville Truck & Tractor Co., Brookville, Pa.  
Fate-Root-Heath Co., Plymouth, Ohio.  
Hadfield-Penfield Steel Co., Bucyrus, Ohio.  
Industrial Equip. Co., Minster, Ohio.  
Jeffrey Mfg. Co., The, Columbus, Ohio.  
Lima Locomotive Works, New York, N. Y.  
Porter Co., H. K., Pittsburgh, Pa.  
Vulcan Iron Works, Wilkes-Barre, Pa.  
Whitcomb Co., Geo. D., Rochelle, Ill.

### MOTORS, ELECTRIC

Burke Electric Co., Erie, Pa.

### MOTOR TRUCKS

Packard Motor Car Co., Detroit, Mich.  
Pierce-Arrow Motor Car Co., Buffalo, N. Y.  
Traylor Eng. & Mfg. Co., Allentown, Pa.

**PACKING**—Sheet, Piston, Superheat, Hydraulic  
Cincinnati Rubber & Mfg. Co., Cincinnati, Ohio.  
N. Y. Belting & Packing Co., New York, N. Y.

### PAINT AND COATINGS

Williams, C. K., & Co., Easton, Pa.

### PERFORATED METALS

Chicago Perforating Co., Chicago, Ill.  
Cross Eng. Co., Carbondale, Pa.  
Hendrick Mfg. Co., Carbondale, Pa.

### PLASTER MACHINERY

Butterworth & Lowe, Grand Rapids, Mich.  
Ehram & Sons Co., J. B., Enterprise, Kans.

### PORTABLE CONVEYORS

Haiss Mfg. Co., Inc., Geo., N. Y. City, N. Y.

### POWDER

Atlas Powder Co., Wilmington, Del.  
Du Pont de Nemours & Co., Inc., E. I., Wil-  
mington, Del.  
Grasselli Powder Co., Cleveland, Ohio.  
Hercules Powder Co., Wilmington, Del.

### POWER TRANSMITTING MACHINERY

Caldwell, H. W., & Son Co., Chicago, Ill.

### PUMPS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
American Manganese Steel Co., Chicago Heights,  
Ill.  
K. C. Hay Press & Tractor Co., Kansas City, Mo.  
Morris Machine Works, Baldwinville, N. Y.  
Traylor Eng. & Mfg. Co., Allentown, Pa.

### PULLEYS

Weller Mfg. Co., Chicago, Ill.

### PULVERIZED FUEL EQUIPMENT

Fuller-Lehigh Co., Fullerton, Pa.

Raymond Bros. Impact Pulv. Co., Chicago, Ill.

### PUMP VALVES

N. Y. Belting & Packing Co., New York, N. Y.

### QUARRY EQUIPMENT

Good Roads Mach. Co., Kennett Square, Pa.  
Universal Road Mach. Co., Kingston, N. Y.

### ROPE, WIRE

American Steel & Wire Co., Chicago, Ill.  
Leschen, A., & Sons Co., St. Louis, Mo.

### SCRAPERS, DRAG

Green, L. P., Chicago, Ill.  
Sauerman Bros., Chicago, Ill.

### SCREENS

Chicago Perf. Co., Chicago, Ill.  
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Good Roads Machinery Co., Kennett Square, Pa.  
Haiss Mfg. Co., Inc., Geo., N. Y. City, N. Y.  
Hendrick Mfg. Co., Carbondale, Pa.  
Link-Belt Co., Chicago, Ill.  
Smith Eng. Works, Milwaukee, Wis.  
Sturtevant Mill Co., Boston, Mass.  
Traylor Eng. & Mfg. Co., Allentown, Pa.  
Tyler Co., The W. S., Cleveland, Ohio.  
Universal Road Mach. Co., Kingston, N. Y.  
Weller Mfg. Co., Chicago, Ill.

### SEPARATORS

Rubert M. Gay Co., New York City.  
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Sturtevant Mill Co., Boston, Mass.  
Tyler Co., The W. S., Cleveland, Ohio.

**SEPARATORS, MAGNETIC**  
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### SHEAVES

Chicago Mining Sheave & Roller Co., Chicago, Ill.  
Weller Mfg. Co., Chicago, Ill.

### SHOVELS—Steam and Electric

Ball Engine Co., Erie, Pa.  
Brown Hoisting Machinery Co., Cleveland, O.  
Bucyrus Co., South Milwaukee, Wis.  
Erie Steam Shovel Co., Erie, Pa.  
Orton & Steinbrenner Co., Chicago, Ill.  
Osgood Co., The, Marion, Ohio.

**SHOVEL REPAIRS**—Steam and Electric  
Taylor-Wharton Iron & Steel Co., High Bridge,  
N. J.

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### SPROCKETS

Weller Mfg. Co., Chicago, Ill.

### STEEL PLATE CONSTRUCTION

Hendrick Mfg. Co., Carbondale, Pa.

### STORAGE BINS

Brown Hoisting Machinery Co., Cleveland, O.  
Neff & Fry, Camden, Ohio

### STUCCO FACINGS

Metro-Nite Co., Milwaukee, Wis.  
Middlebury Marble Co., Brandon, Vt.  
Vermont Milling Products Co., Fair Haven, Vt.

### SWITCHES AND FROGS

Central Frog & Switch Co., Cincinnati, Ohio.  
Easton Car & Constr. Co., Easton, Pa.

### TANKS, STEEL STORAGE

The Blaw-Knox Co., Pittsburgh, Pa.  
Traylor Eng. & Mfg. Co., Allentown, Pa.

### TESTING SIEVES AND TESTING SIEVE SHAKERS

Tyler Co., The W. S., Cleveland, Ohio.

### TRAMWAYS

Interstate Equip. Co., New York, N. Y.

### TRANSFORMERS

Burke Electric Co., Erie, Pa.

### TRANSMISSION MACHINERY

Plamondon Mfg. Co., Chicago, Ill.  
Weller Mfg. Co., Chicago, Ill.

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Link Belt Co., Chicago, Ill.  
Smith Eng. Works, Milwaukee, Wis.

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Easton Car & Constr. Co., Easton, Pa.

### WIRE ROPE

American Steel & Wire Co., Chicago, Ill.  
Leschen, A., & Sons Co., St. Louis, Mo.  
Williamsport Wire Rope Co., Williamsport, Pa.

### WIRE CLOTH

Cleveland Wire Cloth Co., Cleveland, Ohio.  
Tyler Co., The W. S., Cleveland, Ohio.

When writing advertisers please mention ROCK PRODUCTS

# EASTON WON-WAY DUMP CAR



Dumps fast—a lift of 14" and the car automatically discharges—straight, quick, clean.



## TYPE "E"

Built for big quarries and shovel loading. One quarryman operated 16 ten ton cars two years: "practically no repairs." Another has used 35 seven ton cars three years: "carried over 80,000 tons in past 70 days with only the replacement of a drawhead and bolt." A safe, wonderful car—here are a few points—better send for them all.

Reinforced Flat Bottom and Sloping Sides  
Loading and Unloading Made Easy  
No Need to Balance the Load  
Car Height Cuts Down Dipper Travel

No Accumulation in Bottom of Car  
Practically Proof Against Derailment  
Works Equally Well Singly or in Trains  
Fool Proof, Trouble Proof, Almost Wear Proof.

44 Dey Street, New York, N. Y.  
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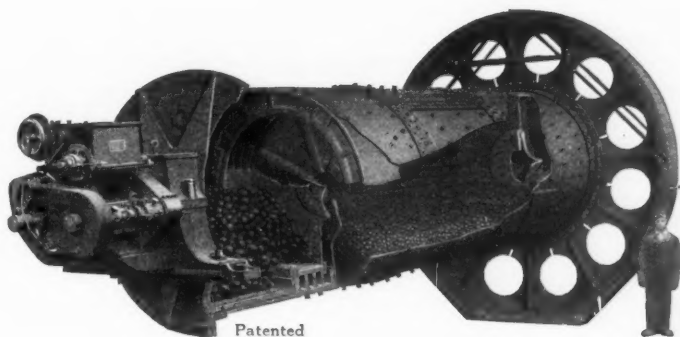
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St. Louis, Mo.

Norfolk, Va.

## EASTON CAR & CONST'N CO.



2157-E



Patented

If you have any grinding problems, the Compeb Mill should receive thorough consideration. This mill, designed to reduce any grindable material, either wet or dry, from sizes 1½" and under to any commercial fineness.

**USE THE COMPEB MILL**

**TO REDUCE GRINDING COSTS**

**ALLIS-CHALMERS MANUFACTURING CO.**  
**MILWAUKEE, WIS. U.S.A.**

*When writing advertisers please mention ROCK PRODUCTS*

## Buyers' Bulletin

**MANUFACTURERS OF MACHINERY AND EQUIPMENT:**—These inquiries are live, up-to-date inquiries that have come direct to us from the individual in each case.

**READERS OF "ROCK PRODUCTS":**—This Department is for your special help and service. If you do not see what you require advertised in "Rock Products," tell us your needs and we will publish them here. There is no charge for this service.

**Dominion Iron & Steel Co., Ltd., Mr. A. Then-erkauf, Asst. Chief Eng., Sydney, Nova Scotia, Can.,** desire catalogs and descriptions of dryers for brick bats and fire clay.

**T. J. Hall & Co., 450 E. Pearl St., Cincinnati, O.,** are in the market for a small locomotive crane for loading wagons and trucks from storage pile; a small crane that will turn clear around, to be on either tractor or wide wheels so that it can be moved around easily.

**Central Sand and Gravel Co., Box 901, Memphis, Tenn.,** desire catalogs and description of the following equipment; steel stiff leg derricks, 60 ft. boom; D. C. 3-drum hoisting engine and 2½ yd. clamshell buckets.

**American Gypsum Co., 202 Kearns Bldg., Salt Lake City, Utah,** attention G. S. Ellsworth, Supt., desires information regarding fuel oil burning rotary kilns for the complete dehydration of gypsum, 75 tons' capacity per 24 hours.

**Luckey Lime and Supply Co., Luckey, Ohio,** advise that they are in the market for a locomotive type air compressor, either new or used, and would like to have prices and complete description.

**Harsh Phosphate Co., Nashville, Tenn.,** advise that they desire information on ½ to 1 yd. electric driven shovel, new or second-hand, to operate on narrow gauge railroad handling disintegrated phosphate rock, handles like dirt. Prefer to rent with privilege of purchasing.

## Free Service to Readers of Rock Products

If you are in the market for any kind of machinery, equipment or supplies, or if you desire catalogs, information or prices on any product, we are at your service—to obtain for you, without expense, catalogs, prices or specific information on every kind of machinery, equipment and supplies—or to help you find the hard to find source of supply.

### RESEARCH SERVICE DEPARTMENT

ROCK PRODUCTS, 542 So. Dearborn St., Chicago, Illinois

Please send me catalogs and prices concerning the following items:

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 Name.....  
 Address.....  
 City..... State.....

Allis-Chalmers Mfg. Co.	81	Gay Co., Robert M.	66	New York Belting & Packing Co.	1
American Process Co.	Inside back cover	Gehret Bros.	62		
American Pulverizer Co.	65	Gilamorgan Pipe & Fdry. Co.	76	Ohio Locomotive Crane Co.	62
Artinstall, S. G., Jr.	72	Good Roads Mach. Co.	64	Orton & Steinbrenner.	14
Atlas Powder Co.	71	Grundried Pat. Cr. & Pulv. Co.	63	Osgood Co., The.	67
Bacon, Earle C., Inc.	63	Haiss Mfg. Co.	79		
Baldwin Locomotive Works	64	Harrington & King Perfr. Co.	68	Pennsylvania Crusher Co.	6
Ball Engine Co.	87	Hadfield-Penfield Steel Co.	62	Pennsylvania Drilling Co.	58
Bates Valve Bag Co.	66	Hatch, James N.	72	Plamondon Mfg. Co., A.	74
Besser Sales Co.	12	Hendrick Mfg. Co.	68	Pierce-Arrow Motor Car Co.	71
Blaw-Knox Co.	18	Hercules Powder Co.	16		
Bradley Pulv. Co.	6	Hunt, R. W., & Co.	72		
Buchanan Co., C. G.	65			Raymond Bros. Impact Pulv. Co.	76
Bucyrus Co.	4	Ingersoll-Rand Co.	10	Robins Conveying Belt Co.	63
Burke Electric Co.	61	International Cooperae Co.	69		
Buyers' Bulletin	82	Industrial Equip. Co.	62	Sanderson Cyclone Drill Co.	69
Buyers' Guide	78-80	Interstate Equip. Co.	61	Sandusky Cooperae Co.	75
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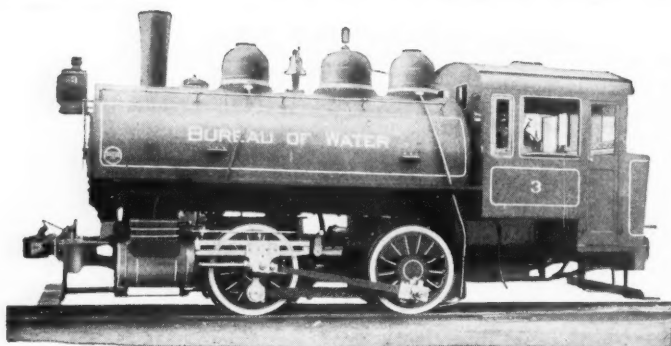
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17 East 42nd St., New York

Lima, Ohio



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Boiler, diameter, 52"  
Steam pressure, 180 lbs.  
Fuel, soft coal  
Grate area, 16 sq. ft.  
Drivers, diameter, 50"  
Wheel base, 7' 6"  
Total weight, 100,000 lbs.  
Tank capacity, 1200 gals.  
Fuel capacity, 2200 lbs.  
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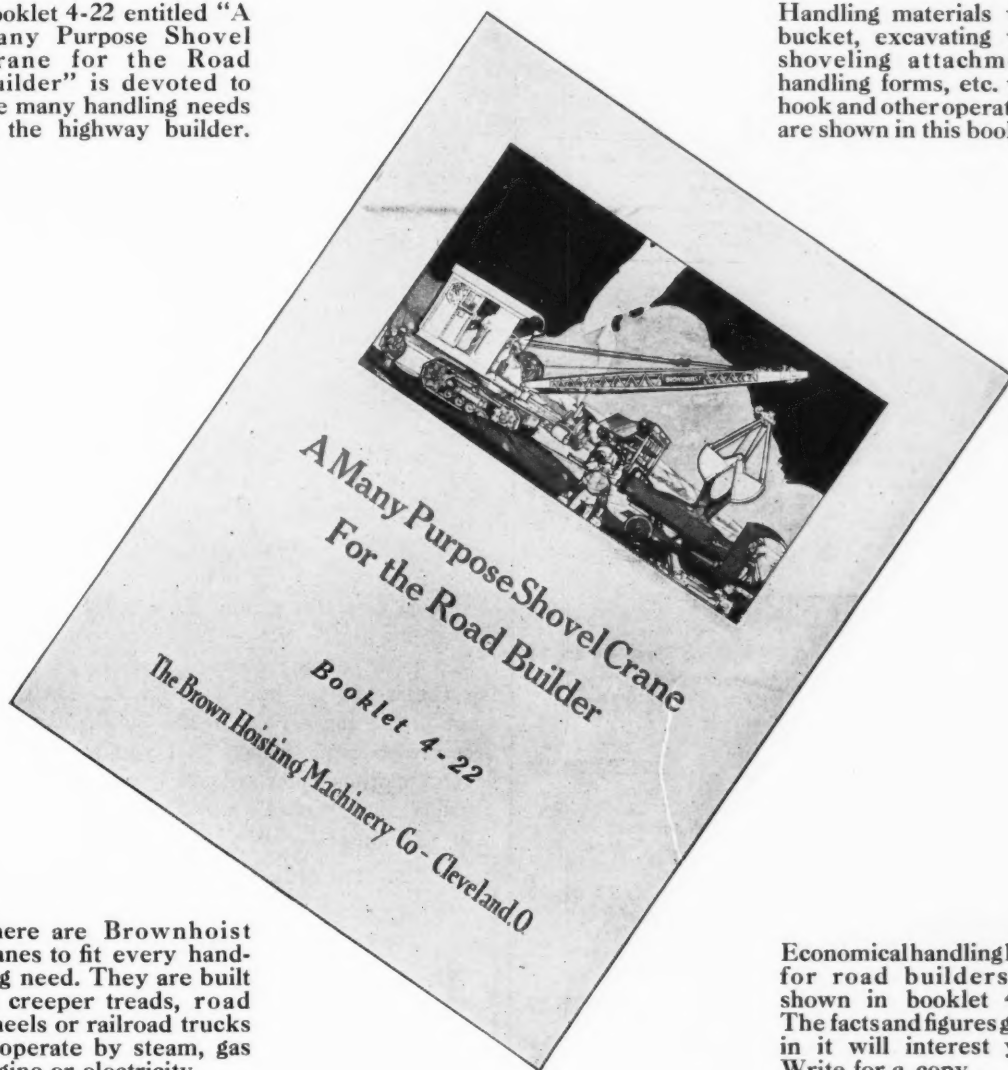
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